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VOL. III

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no. 1
v. 3

U.S. DEPARTMENT OF THE INTERIOR

PROTOTYPE OIL SHALE LEASING PROGRAM

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TRACT C-b

QUARTERLY REPORT #1

(Through November 30, 1974)

Submitted to:

Mr. Peter A. Rutledge
Area Oil Shale Supervisor
Conservation District
U. S. Geological Survey
Grand Junction, Colorado

By:

Ashland Oil, Inc.
Atlantic Richfield Company, Operator
Shell Oil Company
The Oil Shale Corporation

JANUARY 14, 1975

SHOUT
SHARE
IT

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CORE DRILLING AND ASSOCIATED GROUND WATER (CONT'D)

Geophysical Logs

AQUIFER TEST WELL AT-1d

THIS ENVELOPE CONTAINS THE FOLLOWING GEOPHYSICAL LOGS:

Schlumberger: Borehole Compensated Sonic
Laterolog
Formation Density
Neutron Formation Density
Temperature

II B-365

Schlumberger

BOREHOLE COMPENSATED SONIC LOG

COUNTY RIO BLANCO
FIELD or LOCATION
WELL SORGHUM GULCH 1-D
COMPANY ATLANTIC RICHFIELD

COMPANY ATLANTIC RICHFIELD
ET AL
WELL SORGHUM GULCH 1-D
FIELD --
COUNTY RIO BLANCO STATE COLORADO

LOCATION: API Serial No. 7108
1515 W LINE 1511 S LINE
Sec. 7 Twp. 3S Rge. 96W

Other Services:
DIL, FDC,
CNL, GR,
TEMP.

rmanent Datum: GL ; Elev.: 6903
g Measured From GL , 0 Ft. Above Perm. Datum
illing Measured From GL

Elev.: K.B. 6903
D.F. 6903
G.L. 6903

ite	7/28/74			
n No.	ONE			
epth—Driller	1640			
epth—Logger	1632			
m. Log Interval	1620			
p Log Interval	60			
asing—Driller	8 5/8 @ 60	@	@	@
asing—Logger	60			
Size	7 7/8			
pe Fluid in Hole				
Dens. | Visc.	AIR | MIST			
H | Fluid Loss	-- | -- ml	ml	ml	ml
urce of Sample	----			
m @ Meas. Temp.	-- @ -- °F	@ °F	@ °F	@ °F
mf @ Meas. Temp.	-- @ -- °F	@ °F	@ °F	@ °F
mc @ Meas. Temp.	-- @ -- °F	@ °F	@ °F	@ °F
ource: Rmf | Rmc	-- | --			
m @ BHT	-- @ 90 °F	@ °F	@ °F	@
Circulation Stopped				
	12 HOURS			
ax. Rec. Temp.	90 °F	°F	°F	°F
uip. | Location	7674 | VERN			
corded By	STRAWN			
itnessed By	MR TAIT			

The well name, location and borehole reference data were furnished by the customer.

FOLD HERE

SCALE CHANGES

Type Log	Depth	Scale Up Hole	Scale Down Hole

LOGGING DATA

Porosity Selectors				Depth	
Δt_m	Δt_f	Cp	Ø Scale	From	To

REMARKS

$$\text{Velocity (ft/sec)} = \frac{1{,}000{,}000}{\text{Interval Transit Time (microseconds per foot)}}$$

Run No.				
Service Order No.				
Fluid Level				

EQUIPMENT DATA

Sonic Panel No.	130			
Sonic Cart No.	141			
Sonic Sonde No.	161			
Mem. Panel No.	173			
G.R. Cart. No.	98			
G.R. Panel No.	173			
Caliper No.	--			
TTR No.	--			
Centralizers: No.				
Type				
Standoffs: No.				
Type				
Time Const.-Sec.				
Speed - F.P.M.				

CALIBRATION DATA

GR	BKG. CPS				
	Source CPS				
	Tc Sec				

All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to Clause 7 of our General Terms and Conditions as set out in our current Price Schedule.

INTERVAL TRANSIT TIME MICROSECONDS PER FOOT T 3 R₁ 2 R₂

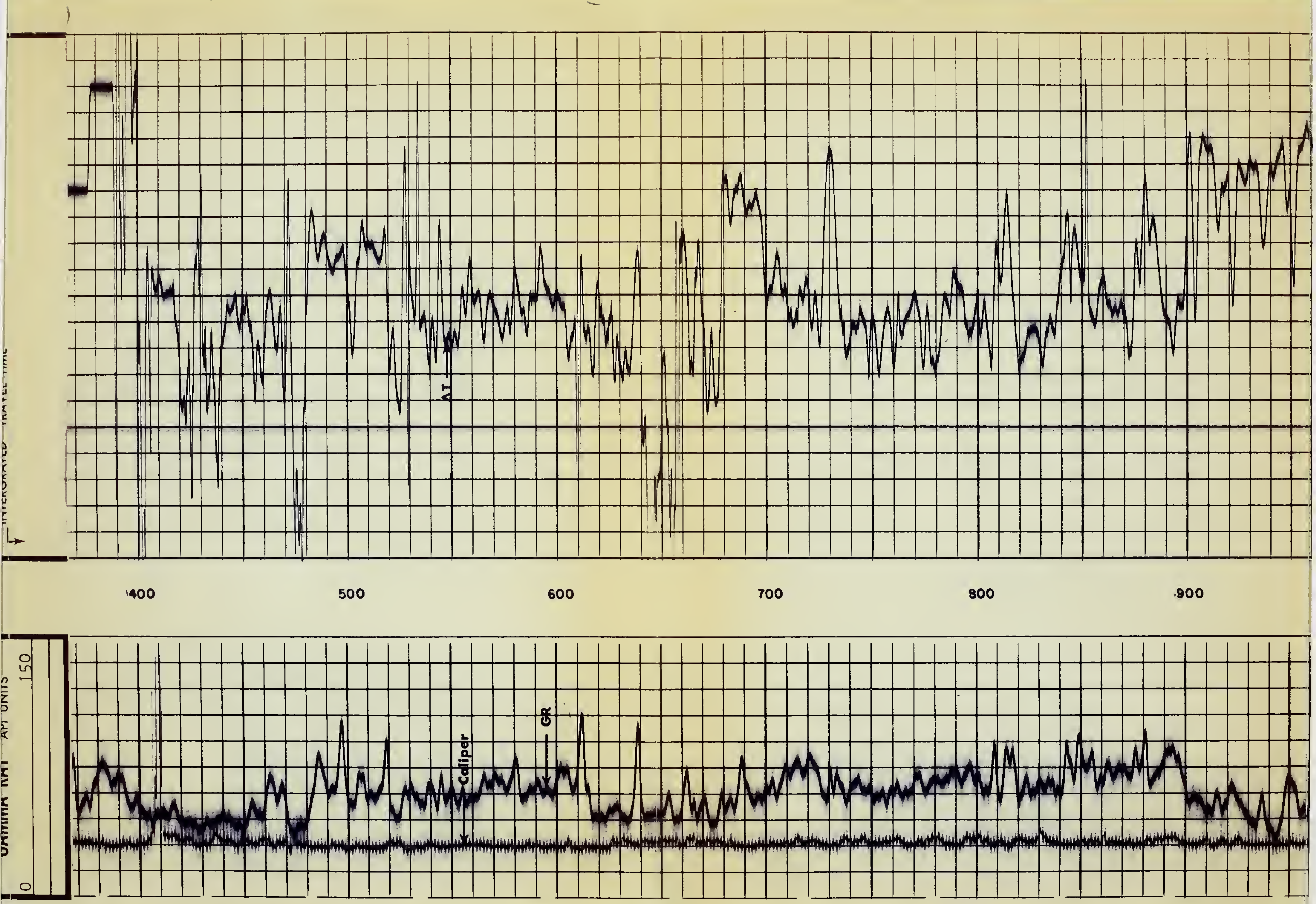
150 100 50

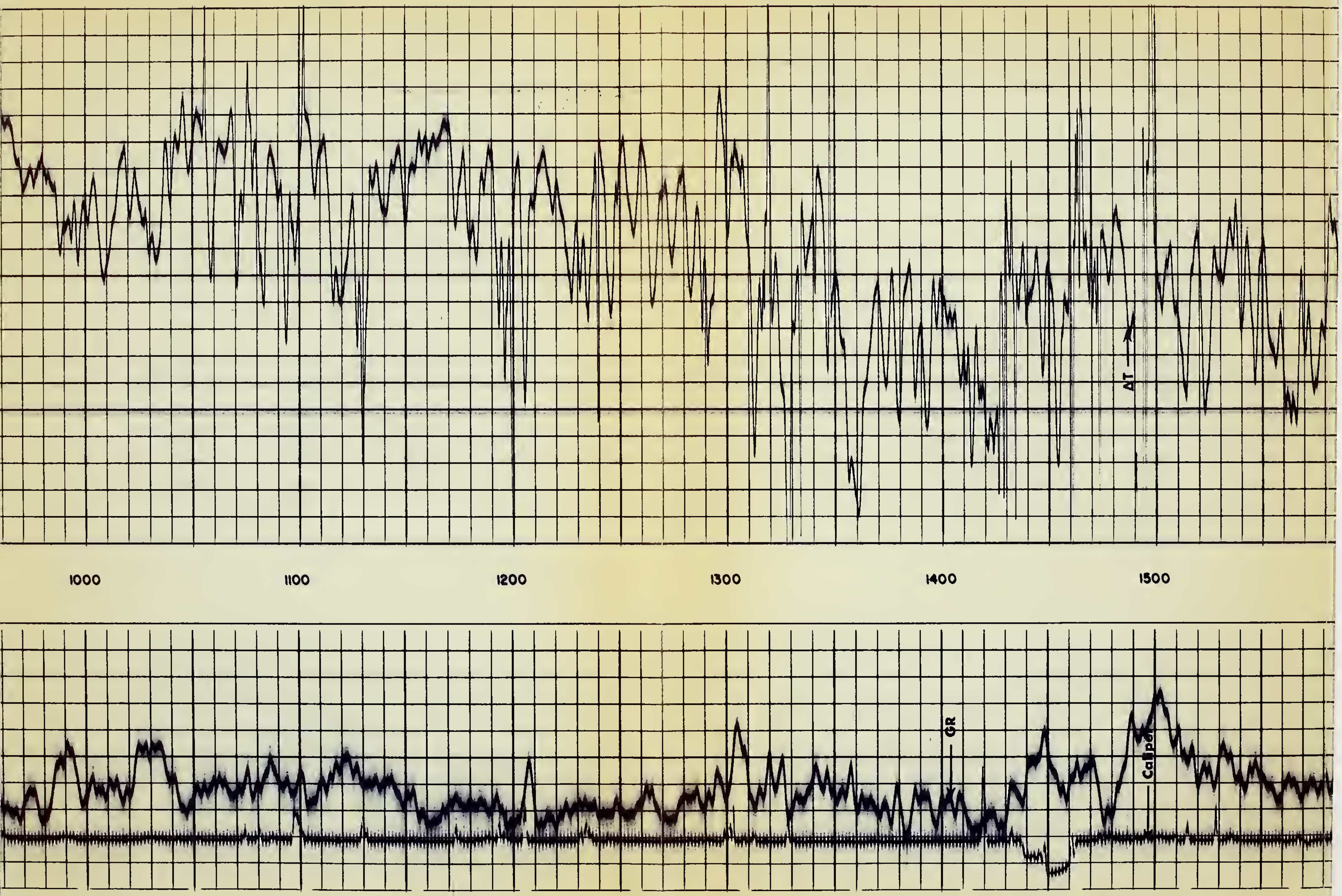
INTERGRATED TRAVEL TIME

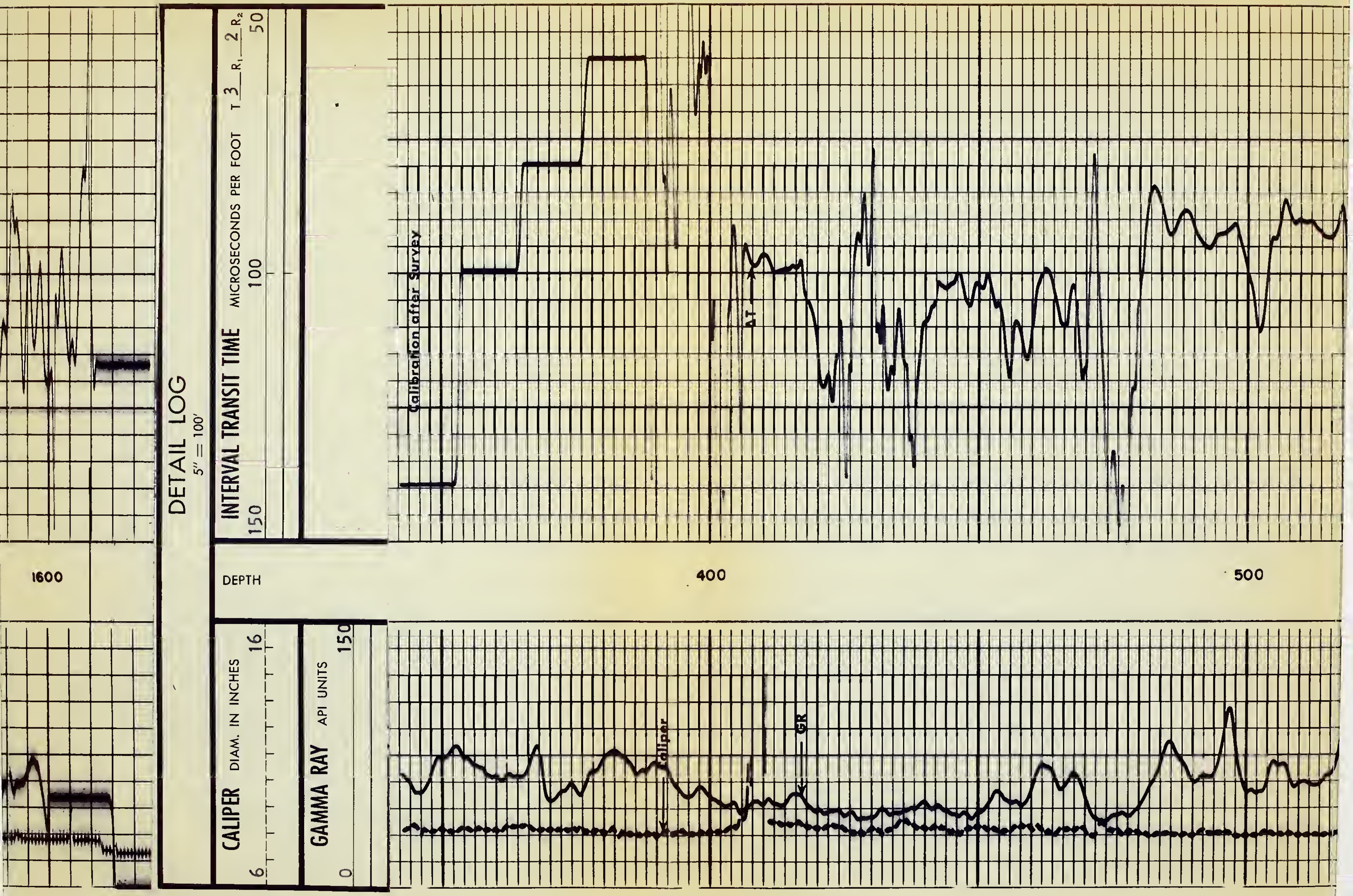
DEPTH

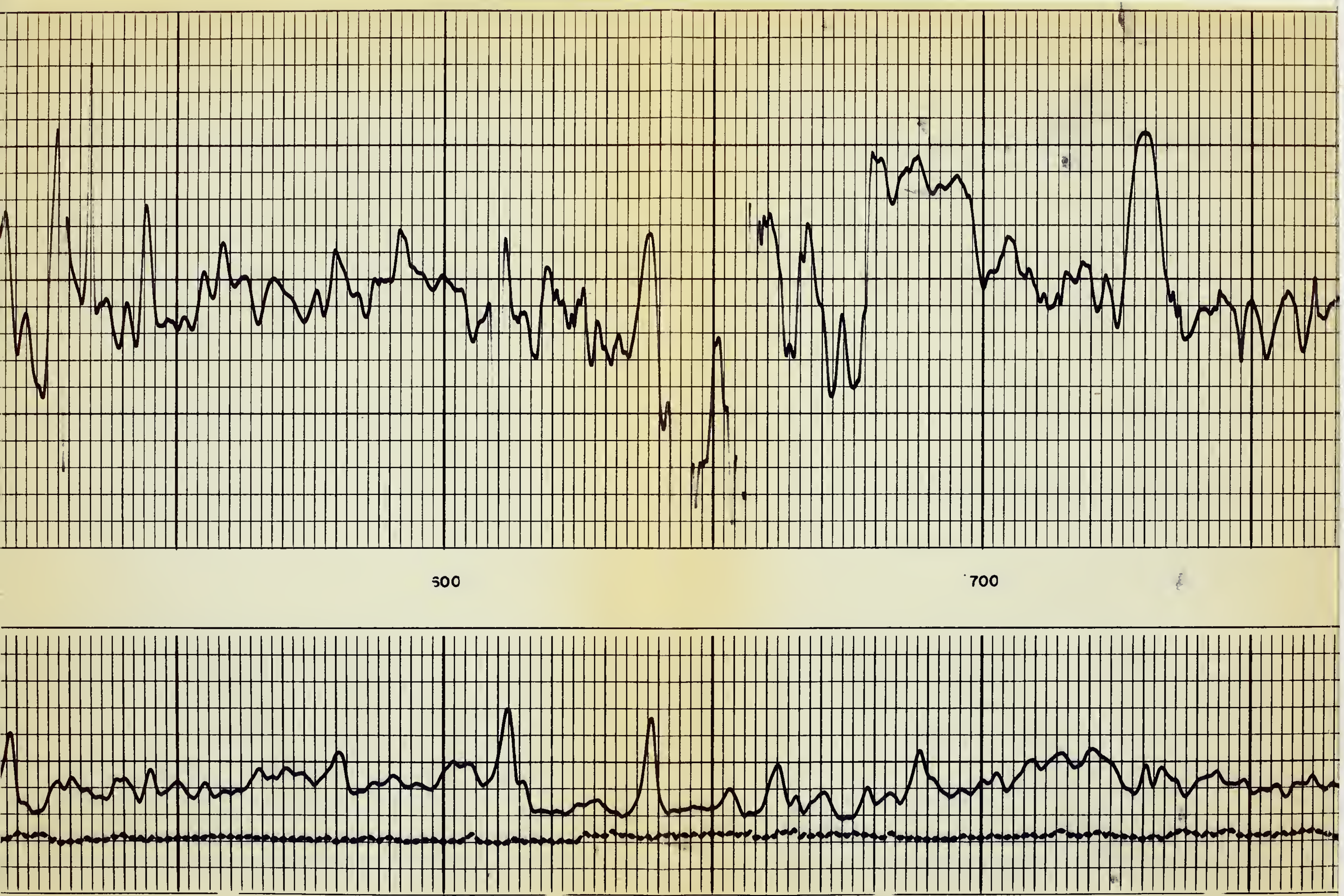
CALIPER DIAM. IN INCHES 6" 16"

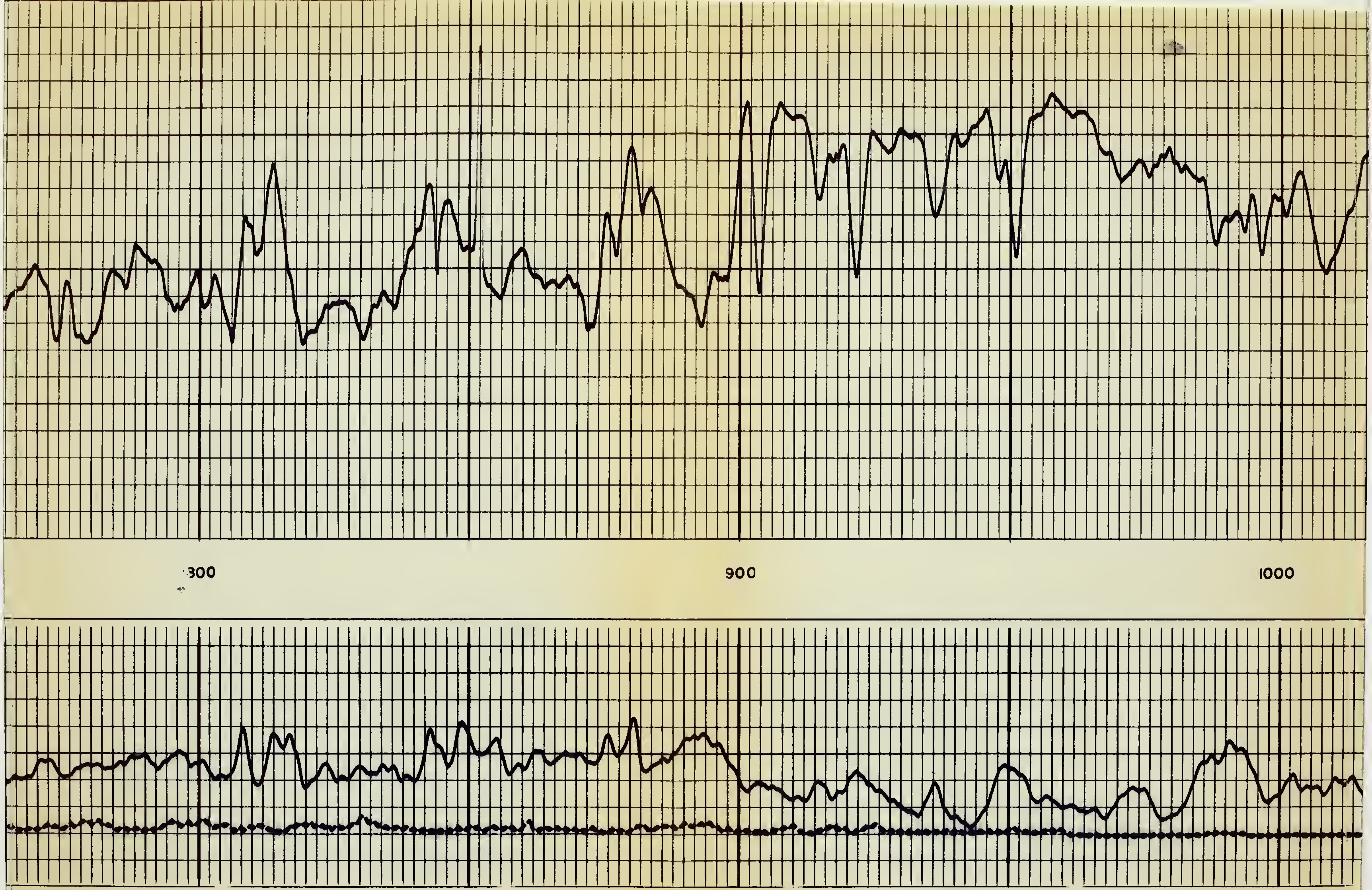
GAMMA RAY API UNITS

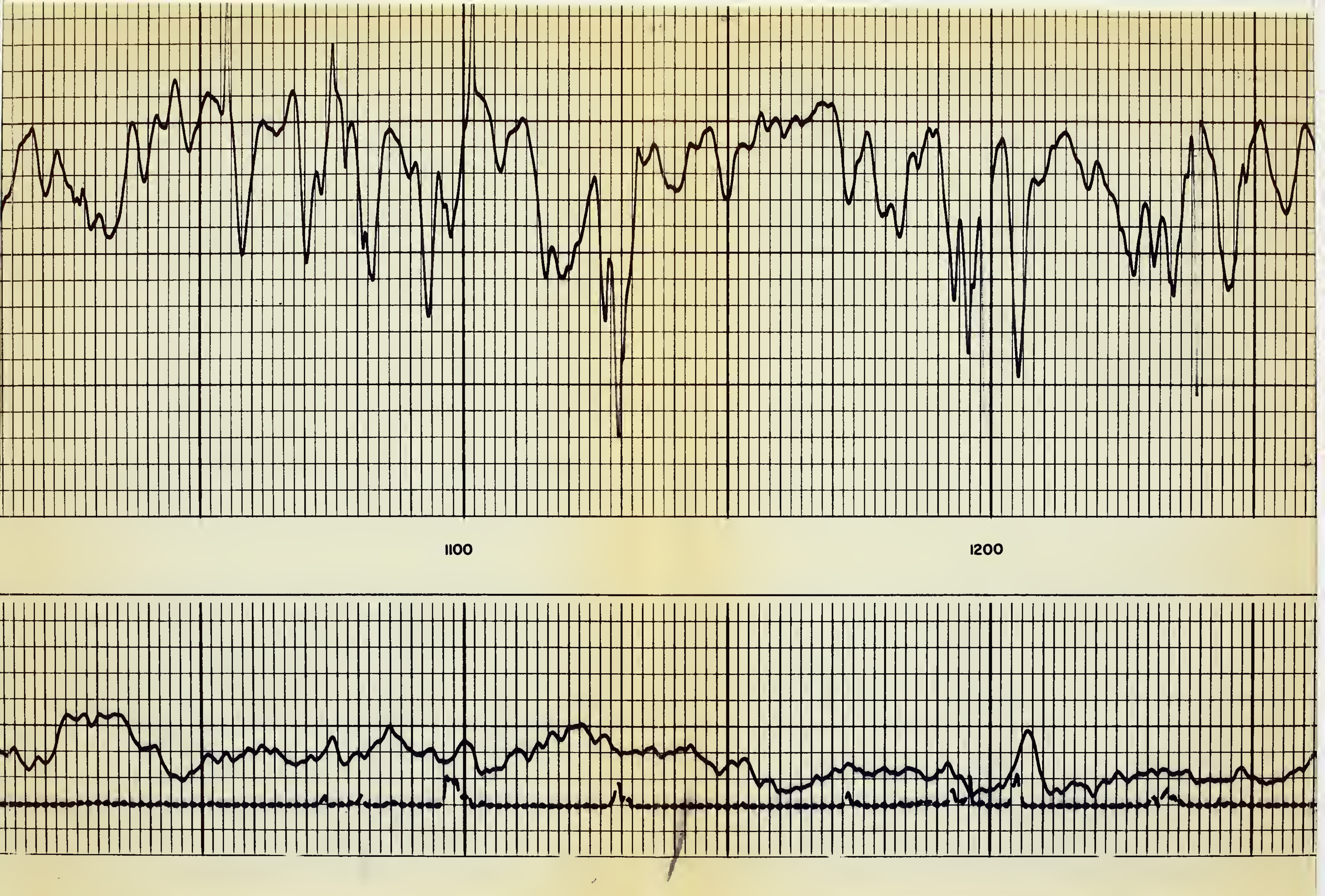

INTEGRATED TRAVEL TIME
ΔT
400
500
600
700
800
900
GAMMA RAY API UNITS
150
0
Caliper
GR

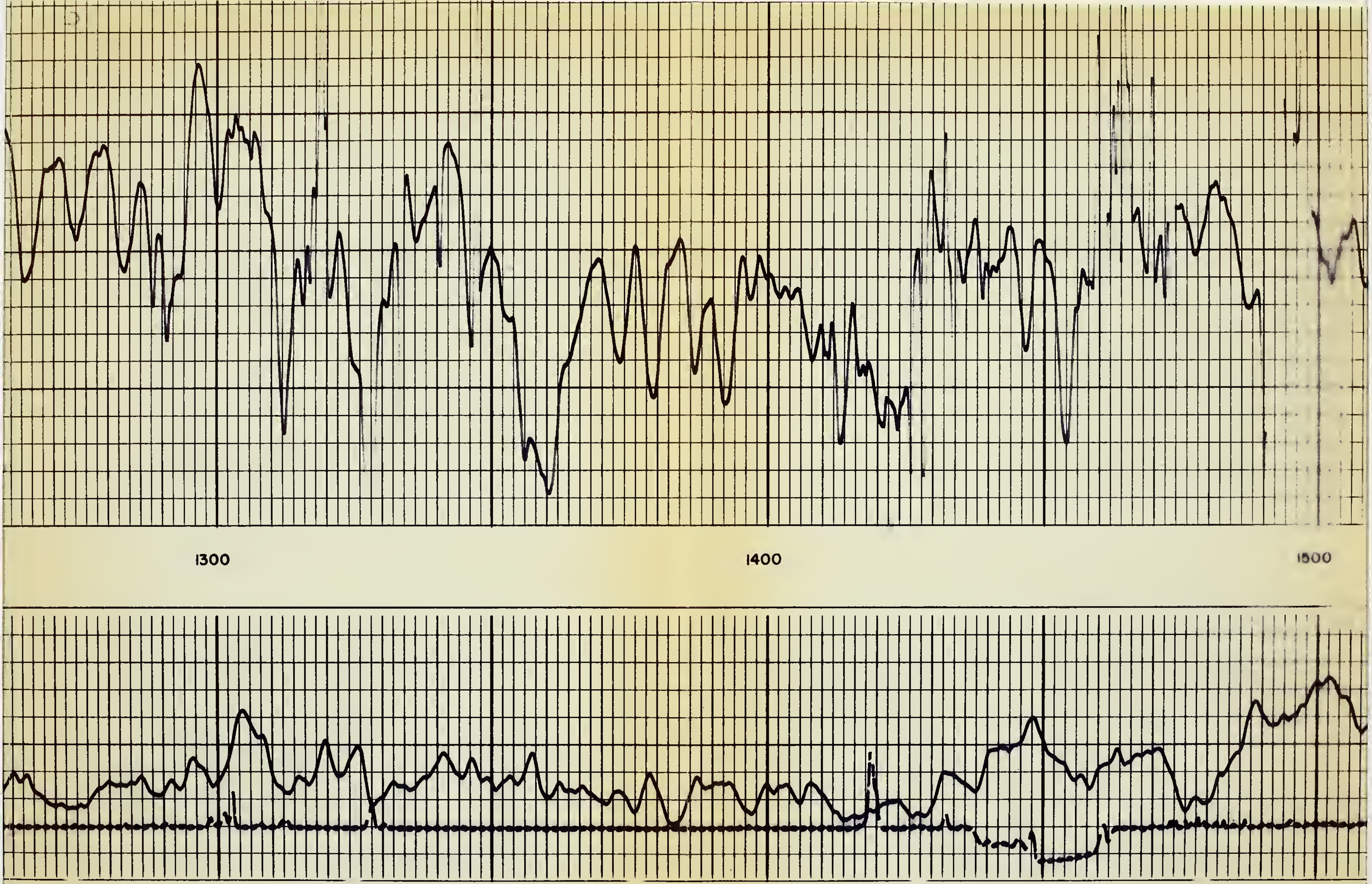

ΔT
1000
1100
1200
1300
1400
1500
GR
Caliper

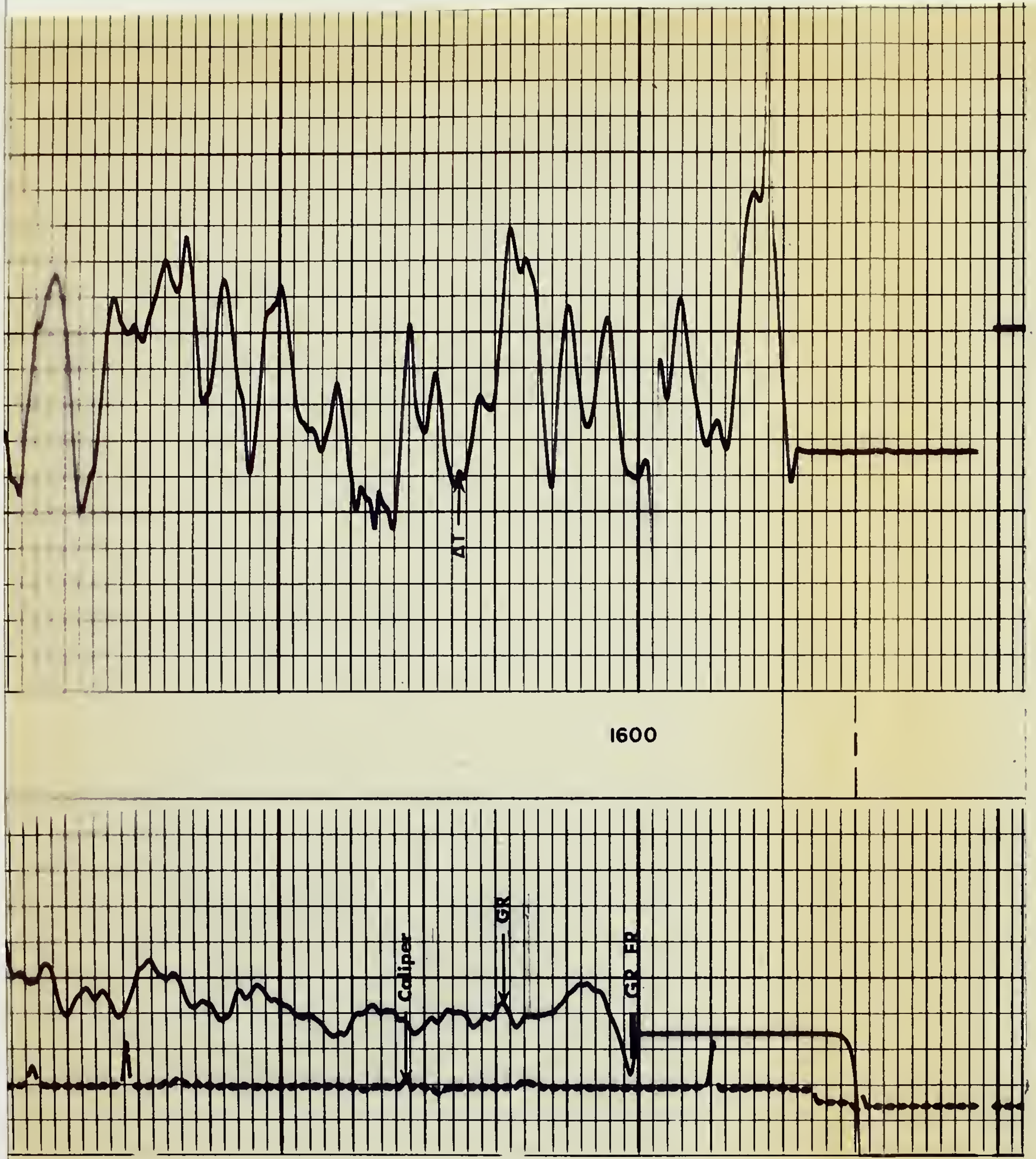

1600
DETAIL LOG
5" = 100'
INTERVAL TRANSIT TIME
MICROSECONDS PER FOOT
T 3 R1 2 R2
150
100
50
DEPTH
CALIPER
DIAM. IN INCHES
6
16
GAMMA RAY
API UNITS
0
150
Calibration after Survey
ΔT
400
500
Caliper
GR

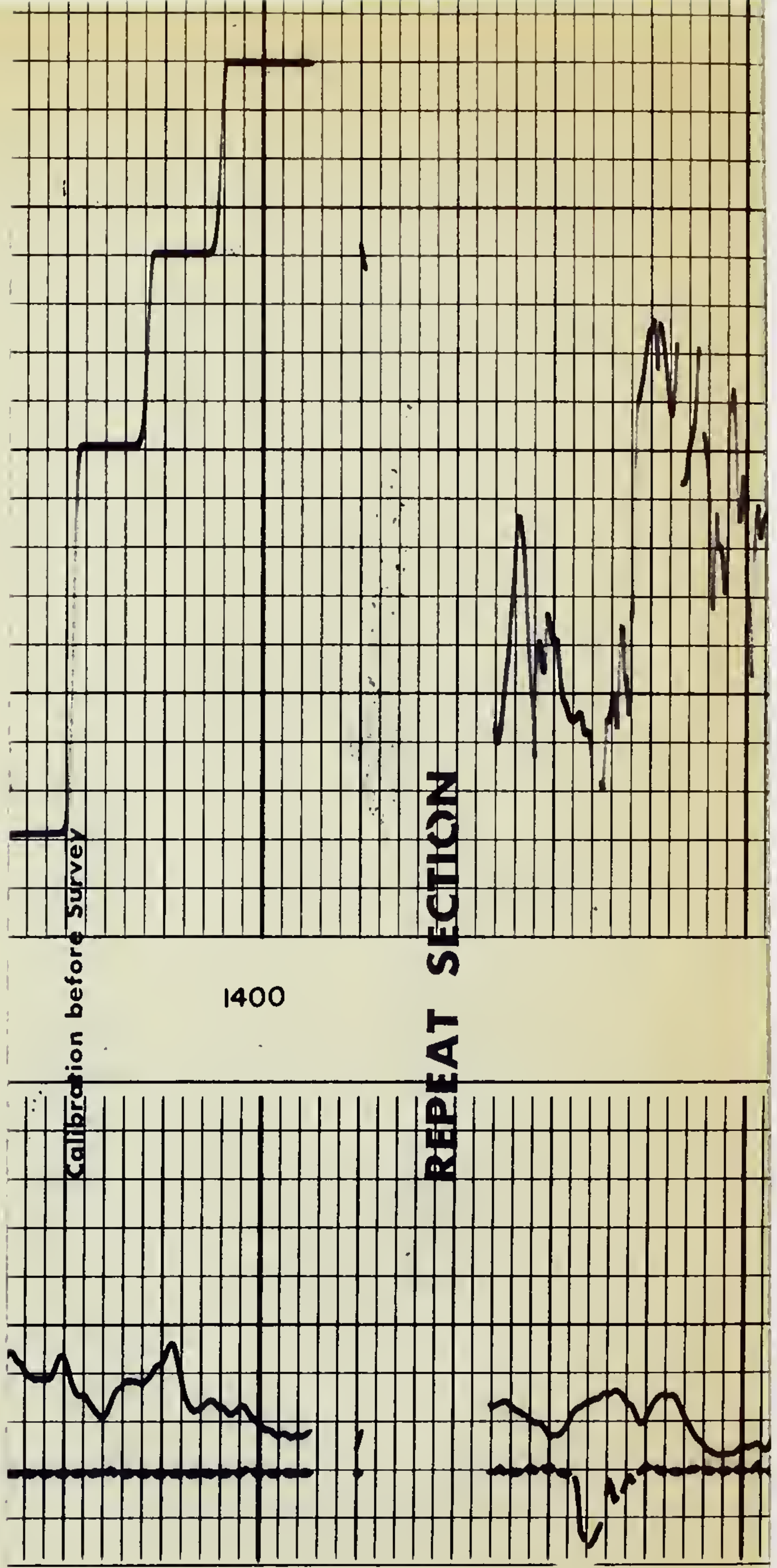

600
700

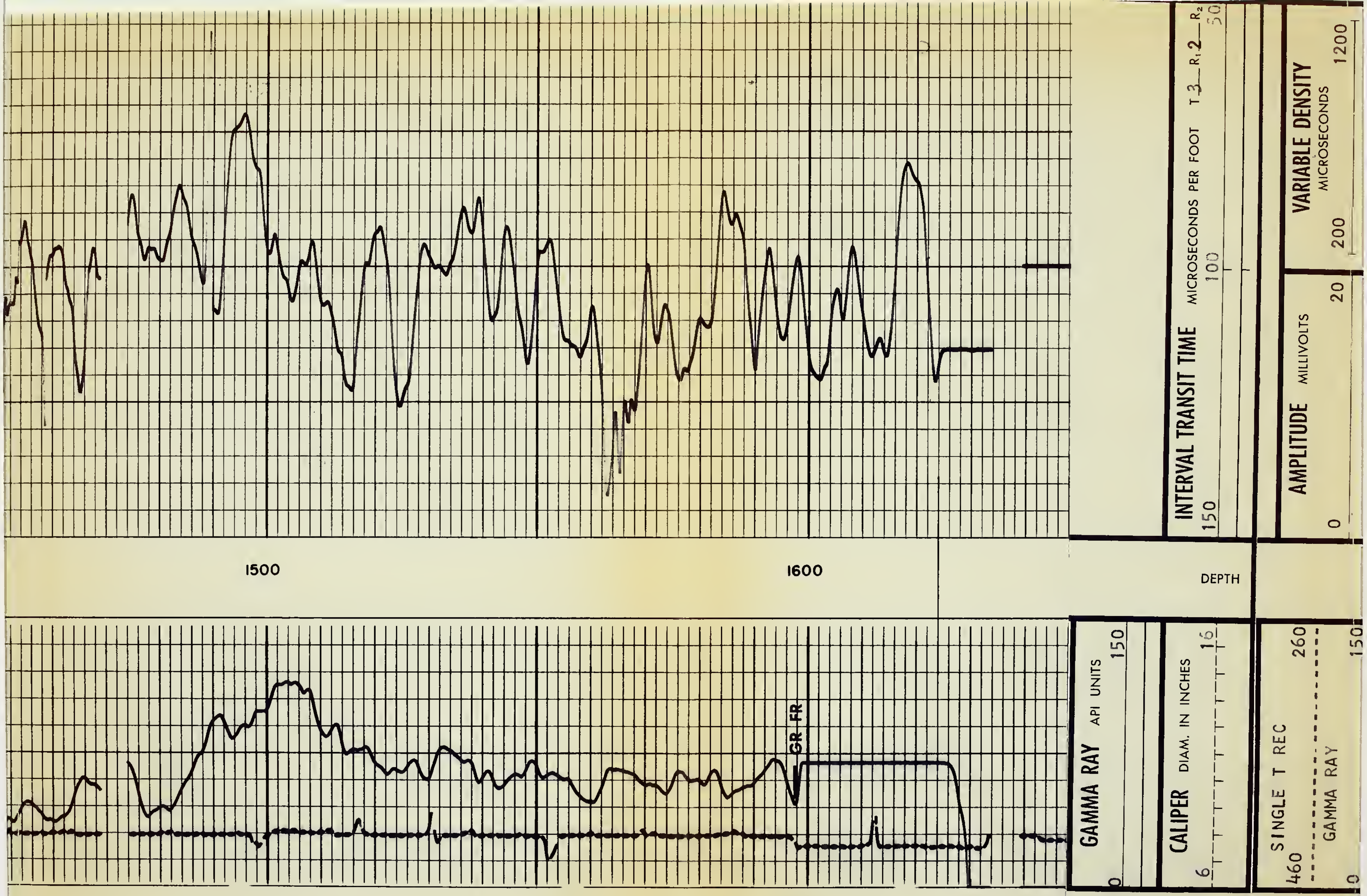

800
900
1000

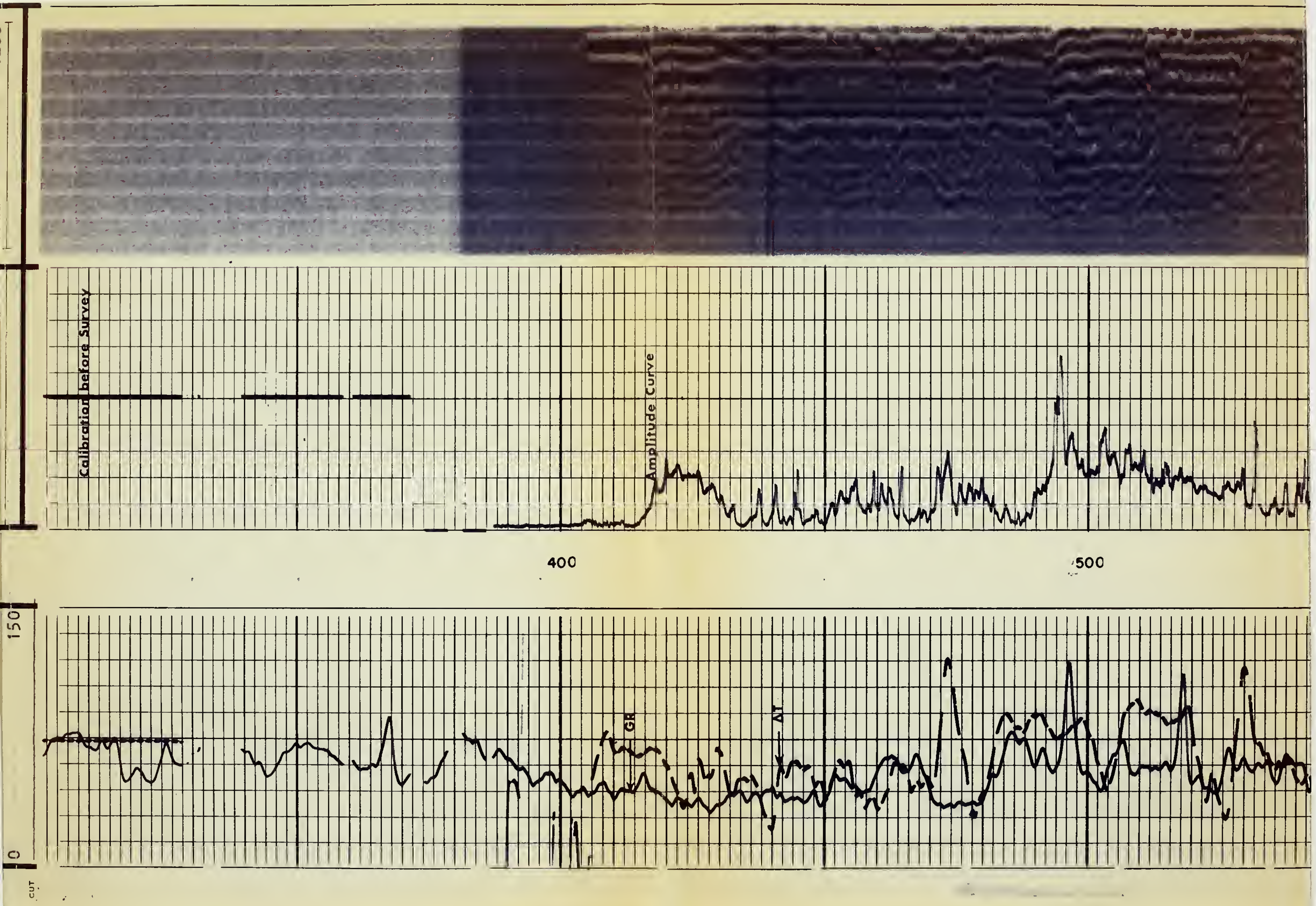

1100
1200

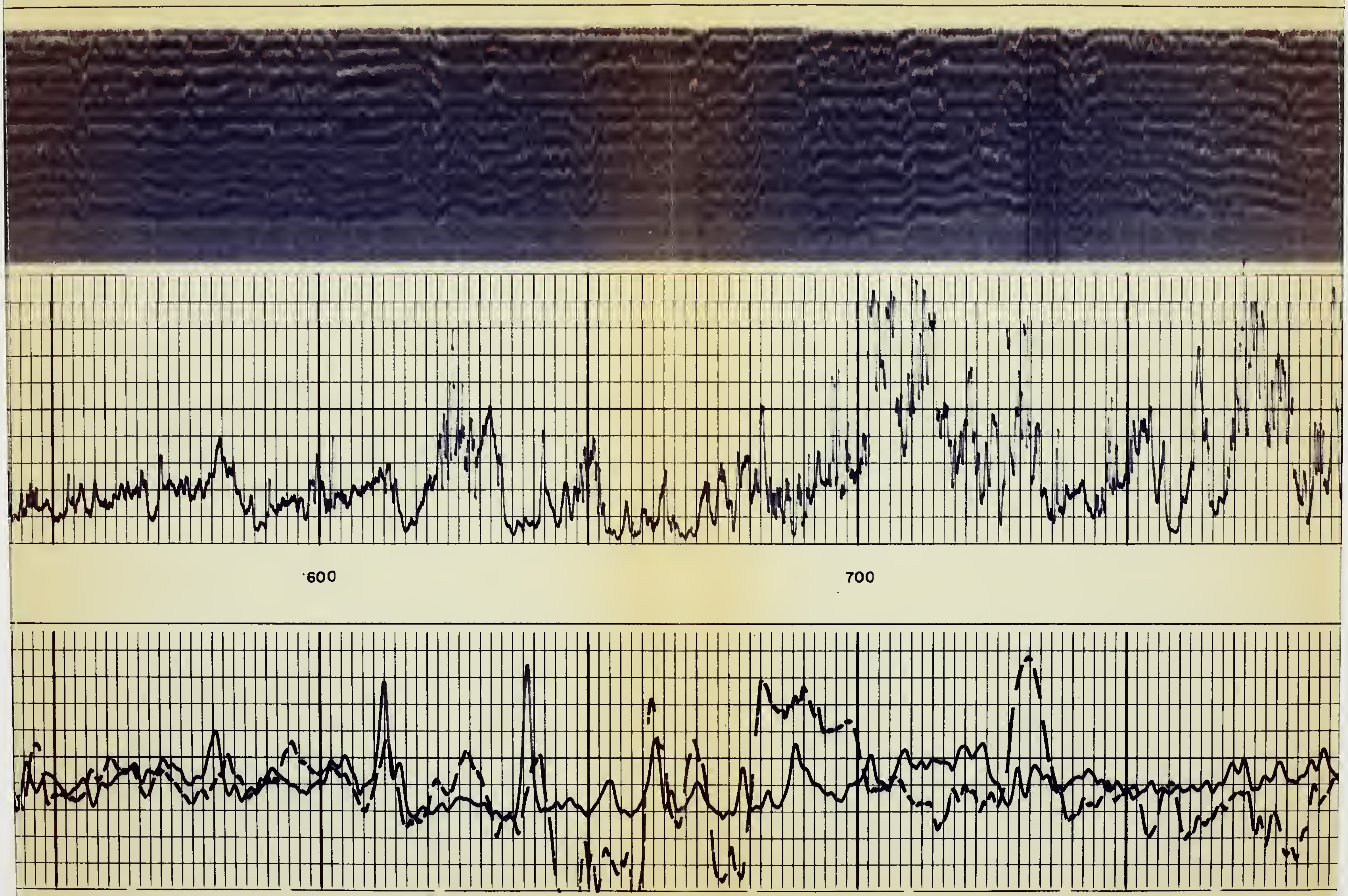

1300
1400
1500

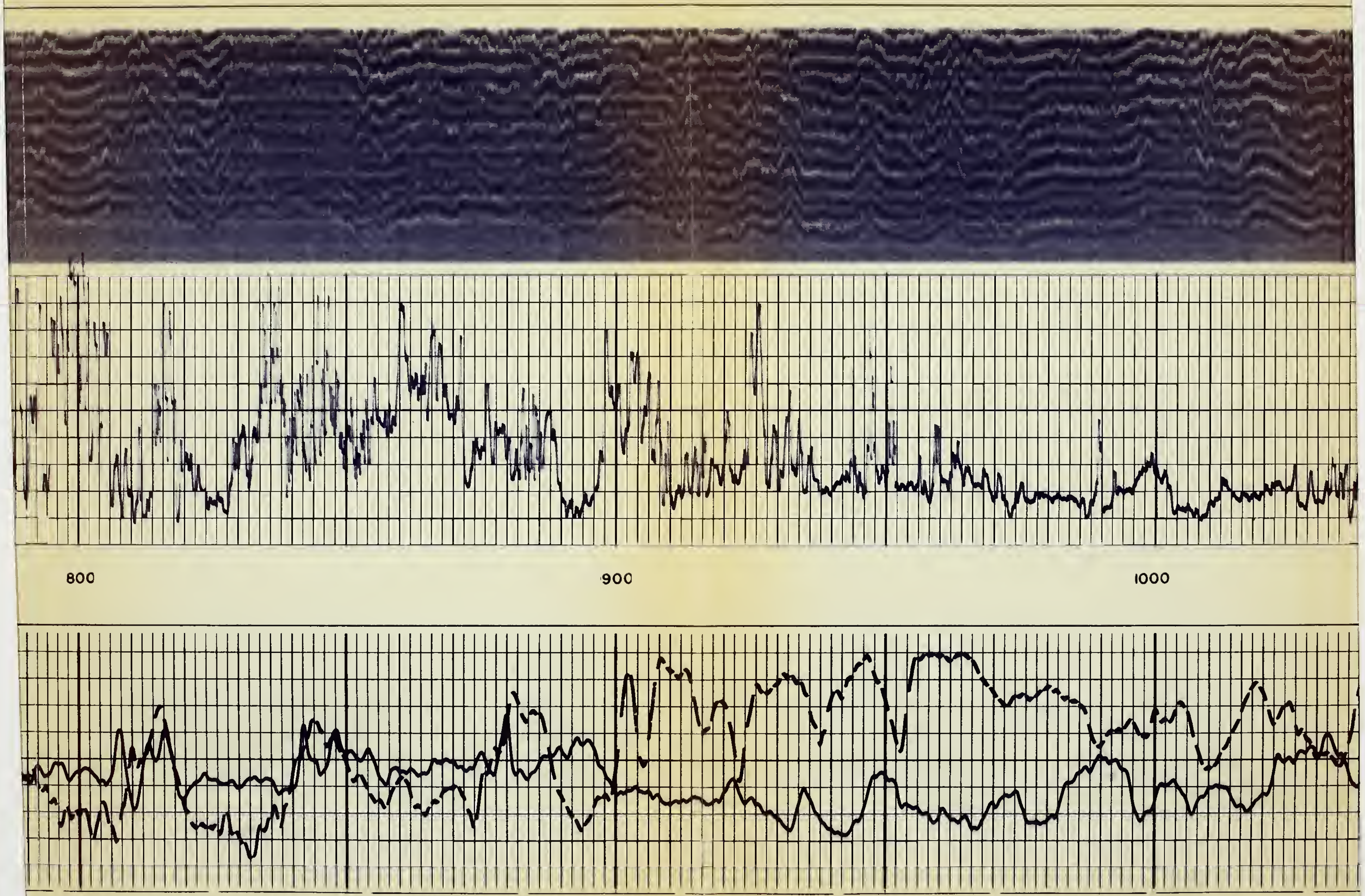

AT
1600
Caliper
GR
GR ER

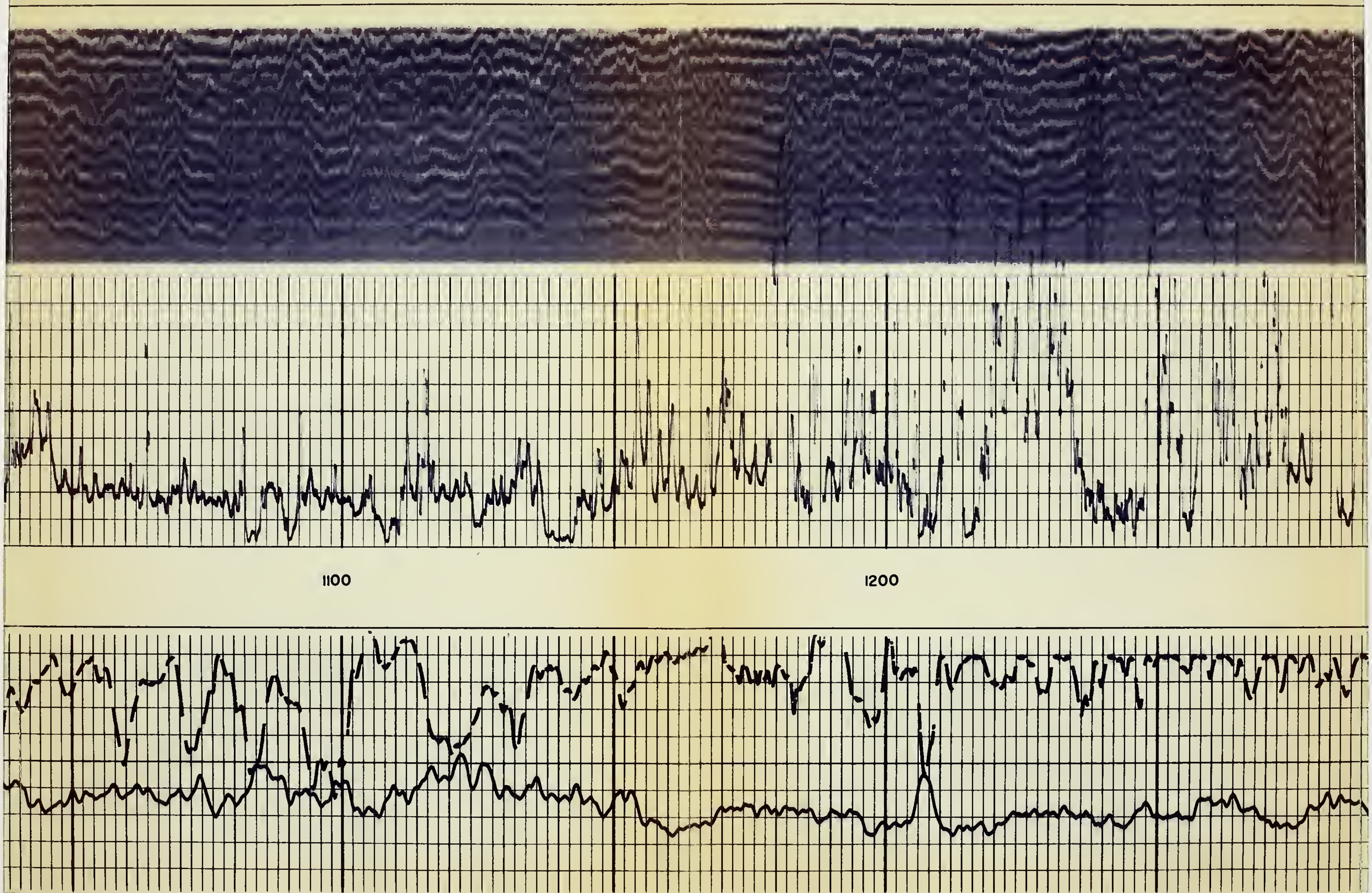

Calibration before Survey
1400
REPEAT SECTION

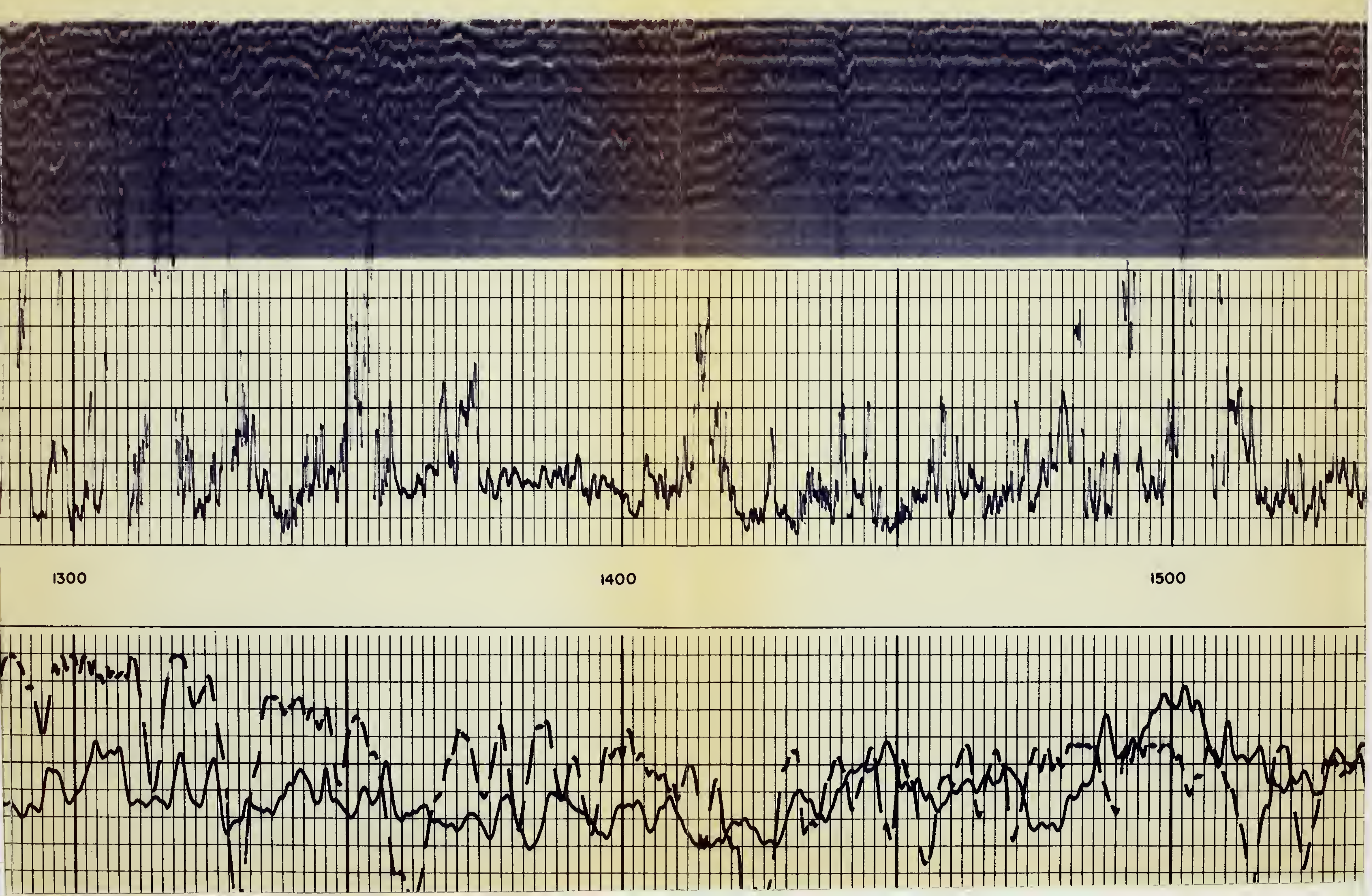

INTERVAL TRANSIT TIME MICROSECONDS PER FOOT
T 3 R1 2 R2
150
100
50
VARIABLE DENSITY MICROSECONDS
200
1200
AMPLITUDE MILLIVOLTS
0
20
1500
1600
DEPTH
GR FR
GAMMA RAY API UNITS
0
150
CALIPER DIAM. IN INCHES
6
16
SINGLE T REC
460
260
GAMMA RAY
0
150

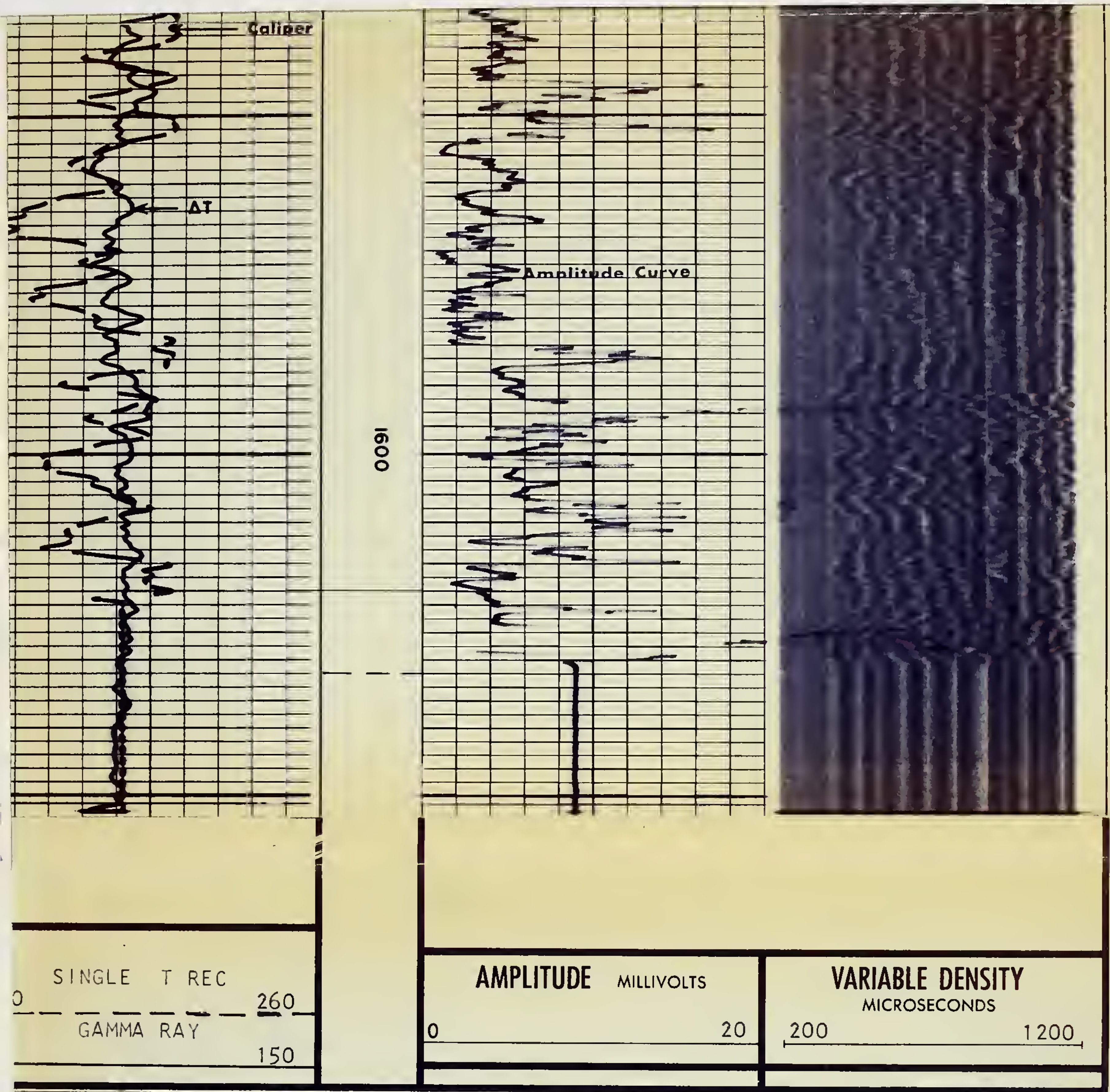

Calibration before Survey
Amplitude Curve
400
500
150
0
GR
ΔT
CUT


600
700


800
900
1000


1100
1200


1300
1400
1500



OMPANY ATLANTIC RICHFIELD
ELL SORGHUM GULCH 1-D
ELD --
OUNTY RIO BLANCO STATE COLORADO

SCHL. FR 1620
SCHL. TD 1632
DRLR TD 1640
Elev:
KB 6903
DF 6903
GL 6903

Schlumberger

COMPENSATED FORMATION DENSITY LOG

Gamma-Gamma

COUNTY RIO BLANCO
FIELD or LOCATION --
WELL SORGHUM 1-D
COMPANY ATLANTIC RICHFIELD

COMPANY ATLANTIC RICHFIELD
ET AL
WELL SORGHUM GULCH 1-D
FIELD
COUNTY RIO BLANCO STATE COLORADO

Location:
1515 W LINE 1511 S LINE
Sec. 7 Twp. 3S Rge. 96W

Other Services:
DIL, BHC, CNL, GR, TEMP

Permanent Datum: GL ; Elev.: 6903
Log Measured From GL , 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B.
D.F.
G.L. 6903

Date	7/28/74			
Run No.	ONE			
Depth—Driller	1640			
Depth—Logger	1632			
Btm. Log Interval	1631			
Top Log Interval	60			
Casing—Driller	8 5/8 @ 60	@	@	@
Casing—Logger	60			
Bit Size	7 7/8			
Type Fluid in Hole	AIR MIST			
Fluid Level				
Dens. | Visc.	-- | --	|	|	|
pH | Fluid Loss	-- | -- ml	| ml	| ml	| ml
Source of Sample	--			
R_m @ Meas. Temp.	-- @ -- °F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	-- @ -- °F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	-- @ -- °F	@ °F	@ °F	@ °F
Source: R_{mf} | R_{mc}	-- | --	|	|	|
R_m @ BHT	-- @ -- °F	@ °F	@ °F	@ °F
Time Since Circ.	10 HRS			
Max. Rec. Temp.	80 °F	°F	°F	°F
Equip. | Location	7674 | VERN	|	|	|
Recorded By	STRAWN			
Witnessed By	MR. TAIT			

SWS-1381-G

The well name, location and borehole reference data were furnished by the customer.

FOLD HERE

SCALE CHANGES

Type Log	Depth	Scale Up Hole	Scale Down Hole

LOGGING DATA

		FDC Selectors			
Liquid Density	Grain Density	Hole Fluid	Porosity Scale	From	To
1.0	2.71	LIQ.	45%	60	1640

REMARKS

Service Order No. -
API Serial No. - 7108

CHANGES IN MUD TYPE OR ADDITIONAL SAMPLES

Date		
Sample No.		
Depth - Driller		
Type Fluid		
Source of Sample		
R_m @ Meas. Temp.	@ °F	@ °F
R_{mf} @ Meas. Temp.	@ °F	@ °F
R_{mc} @ Meas. Temp.	@ °F	@ °F
R_m @ BHT	@ °F	@ °F
Dens. | Visc.		
ph | Fluid Loss	ml	ml
% Water by Vol.		
% Oil by Vol.		
% Solids by Vol.		
Solids Av. Sp. Gr.		

EQUIPMENT DATA

Run No.	ONE
Panel No.	355
Cart No.	333
Skid No.	549
Sonde No.	238
Source	2940
Calibrator	545
GR Cort.	98
TTR	--
Mem Panel	173

BIT SIZE/CASING DATA

Bit	From	To	Csg. Size	Csg. Wt.	From	To

CALIBRATION DATA

Run No.	Gamma Ray			FDC — Before Lag — ACPS		FDC — After Lag — ACPS	
	API Scale	Background CPS	Total CPS	P_1	P_2	P_1	P_2
1	0-130	60	160	432	720	440	720
2							
3							
4							

All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to Clause 7 of our General Terms and Conditions as set out in our current Price Schedule.

CALIPER
HOLE DIAM. IN INCHES
6" — 16"

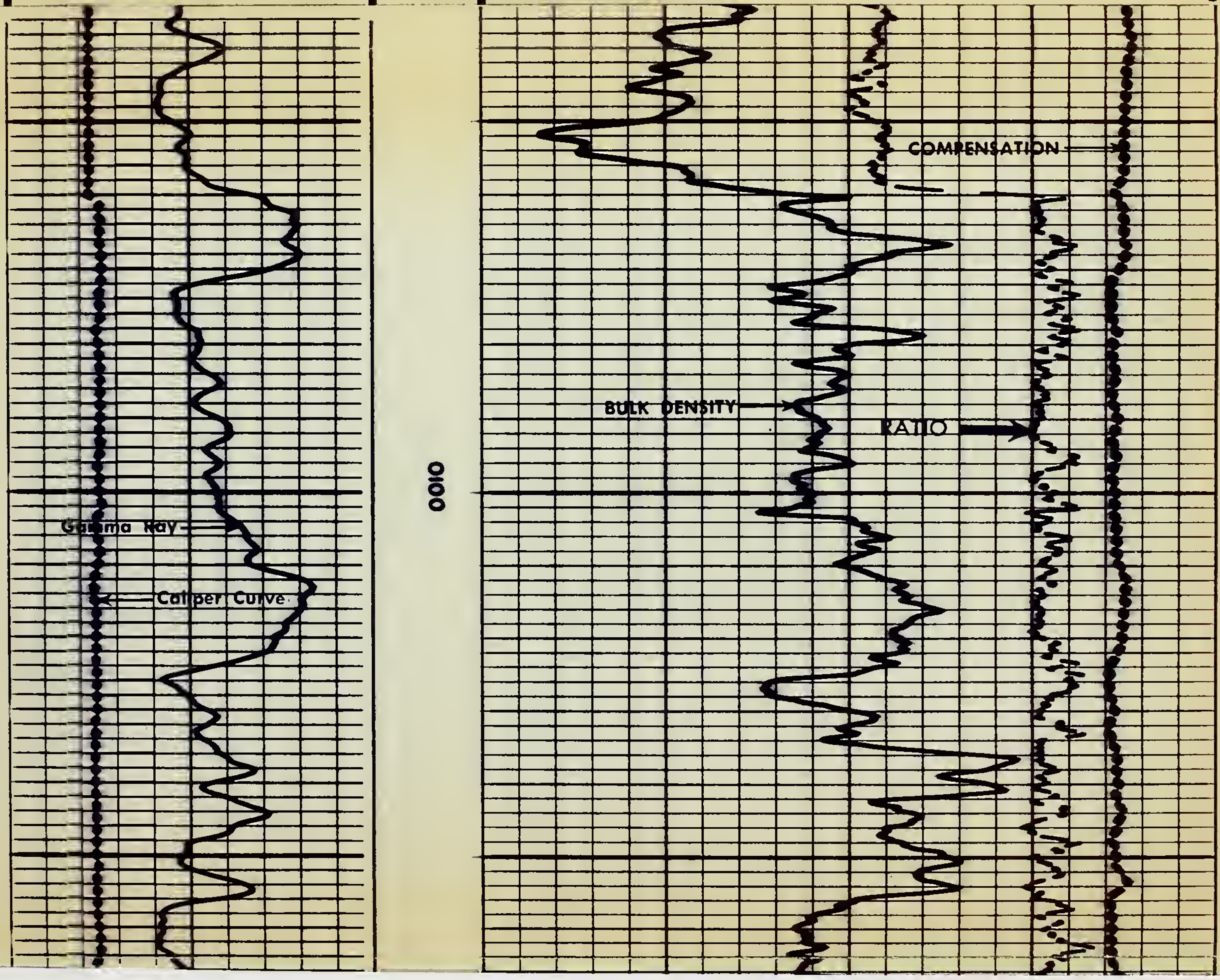
DEPTHS

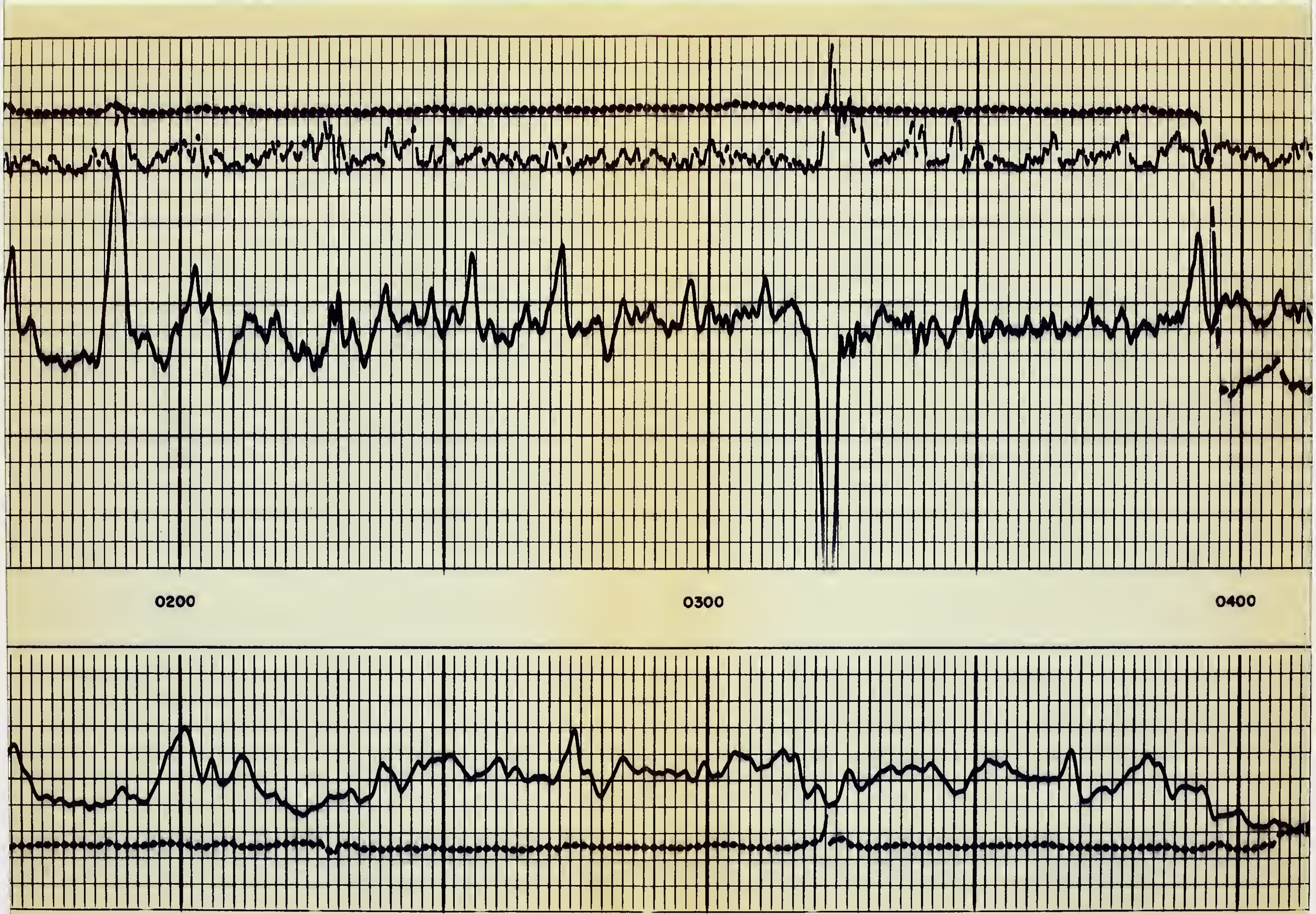
−.25 — 0 — +.25
CORRECTION
GRAMS/CC.

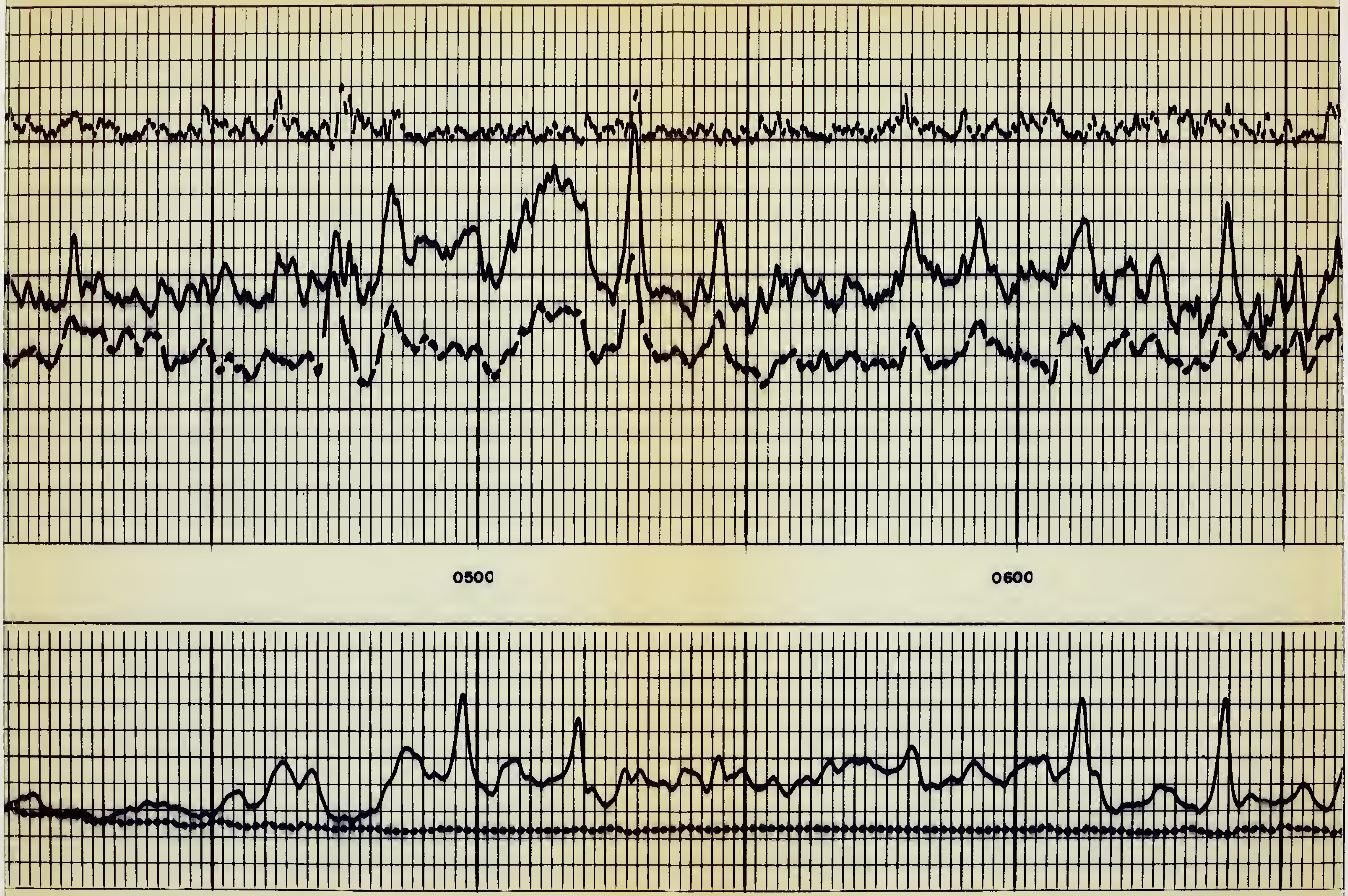
GAMMA RAY
API UNITS
0 — 150

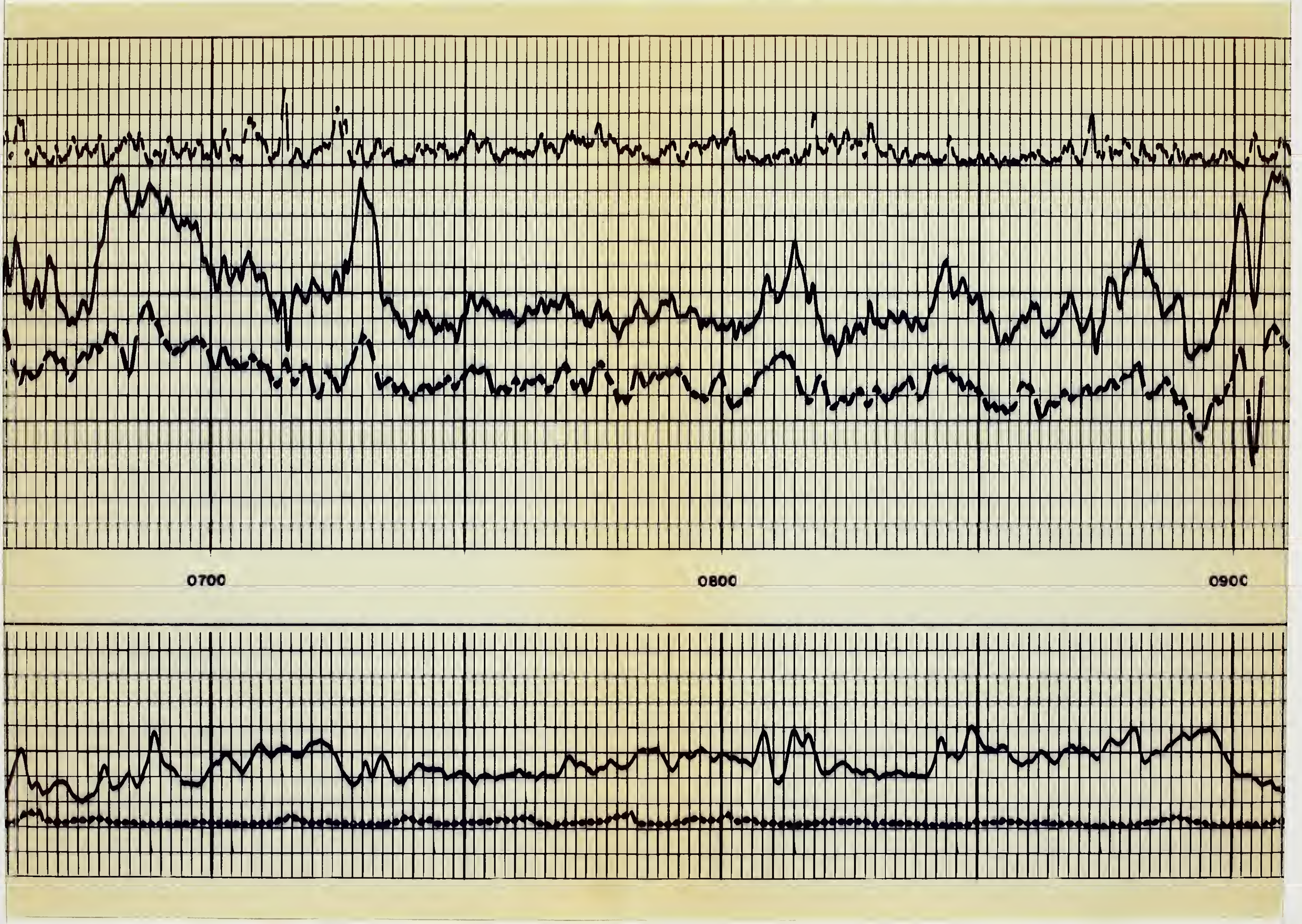
BULK DENSITY
GRAMS CC.
1.7 — 2.2 — 2.7

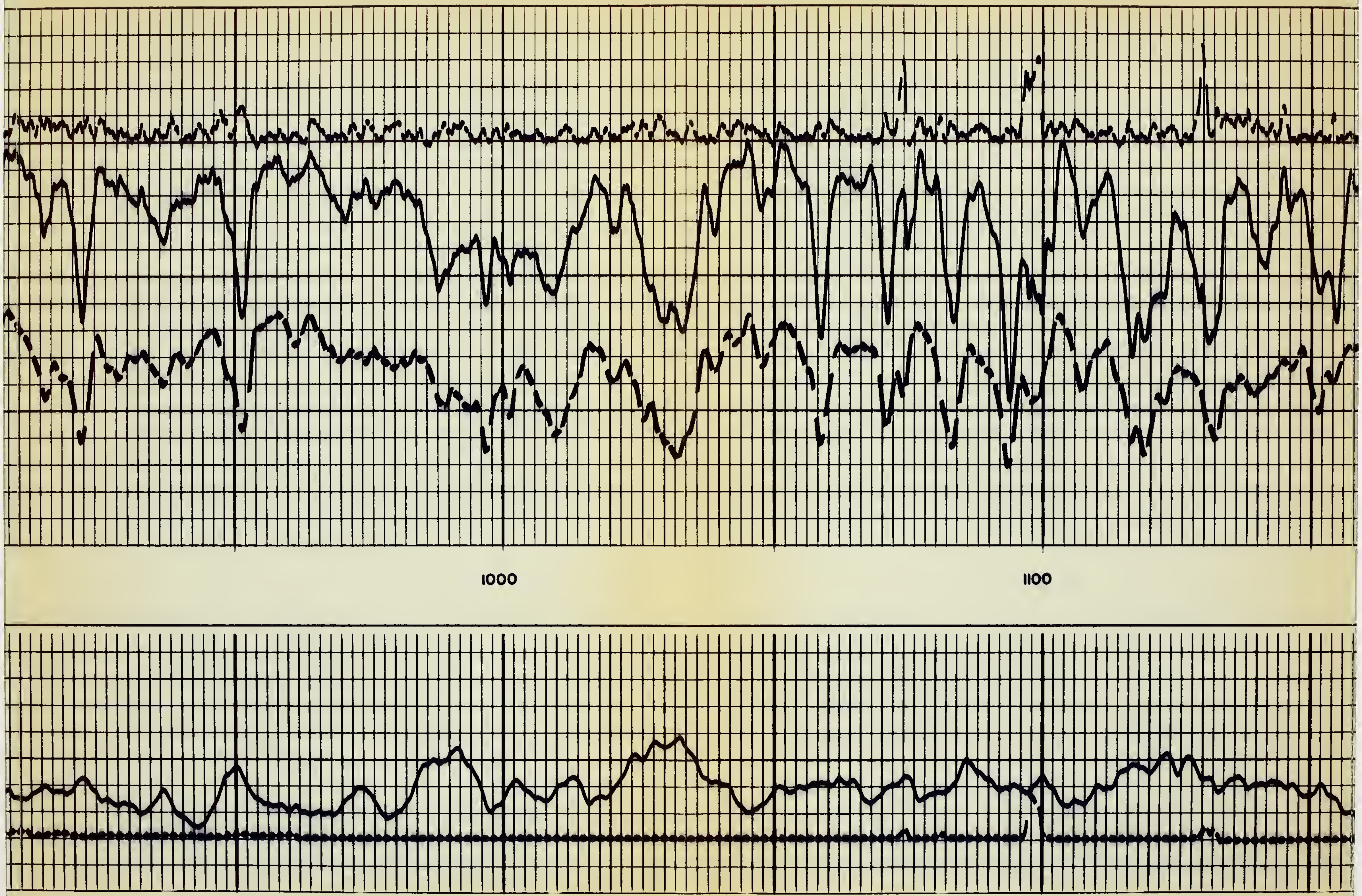
RATIO
5.0 — 2.5 — 0

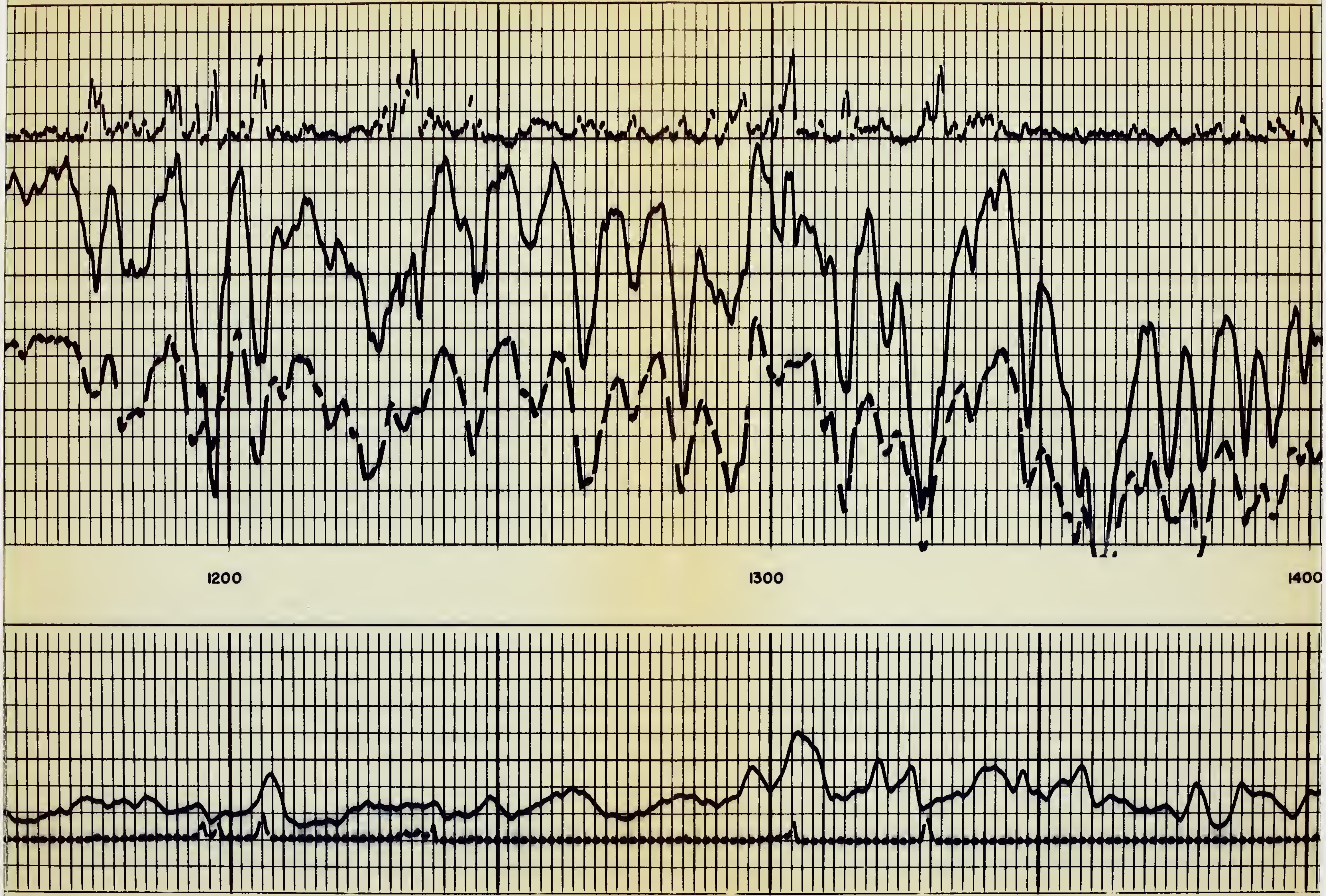


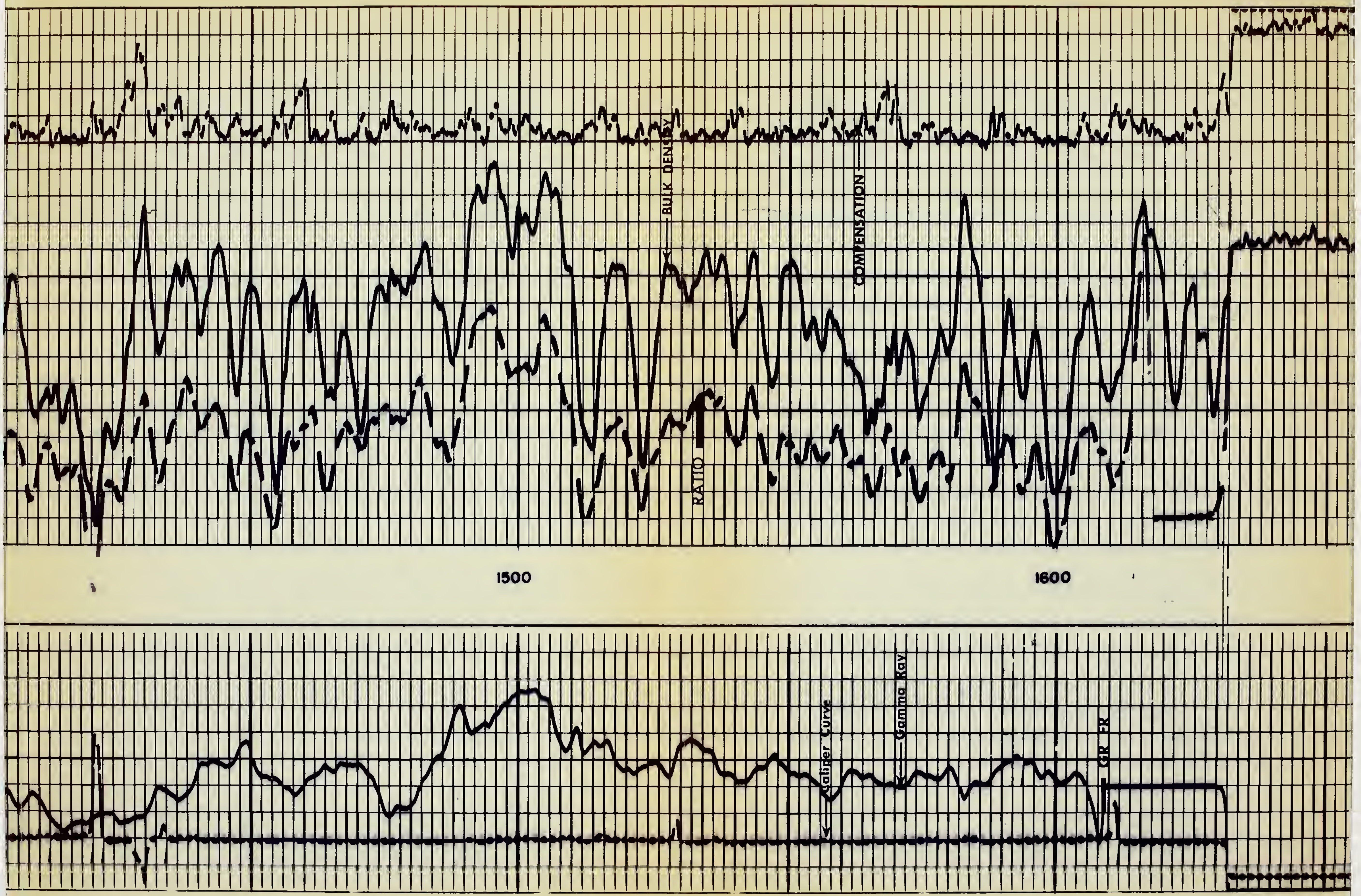

0200
0300
0400

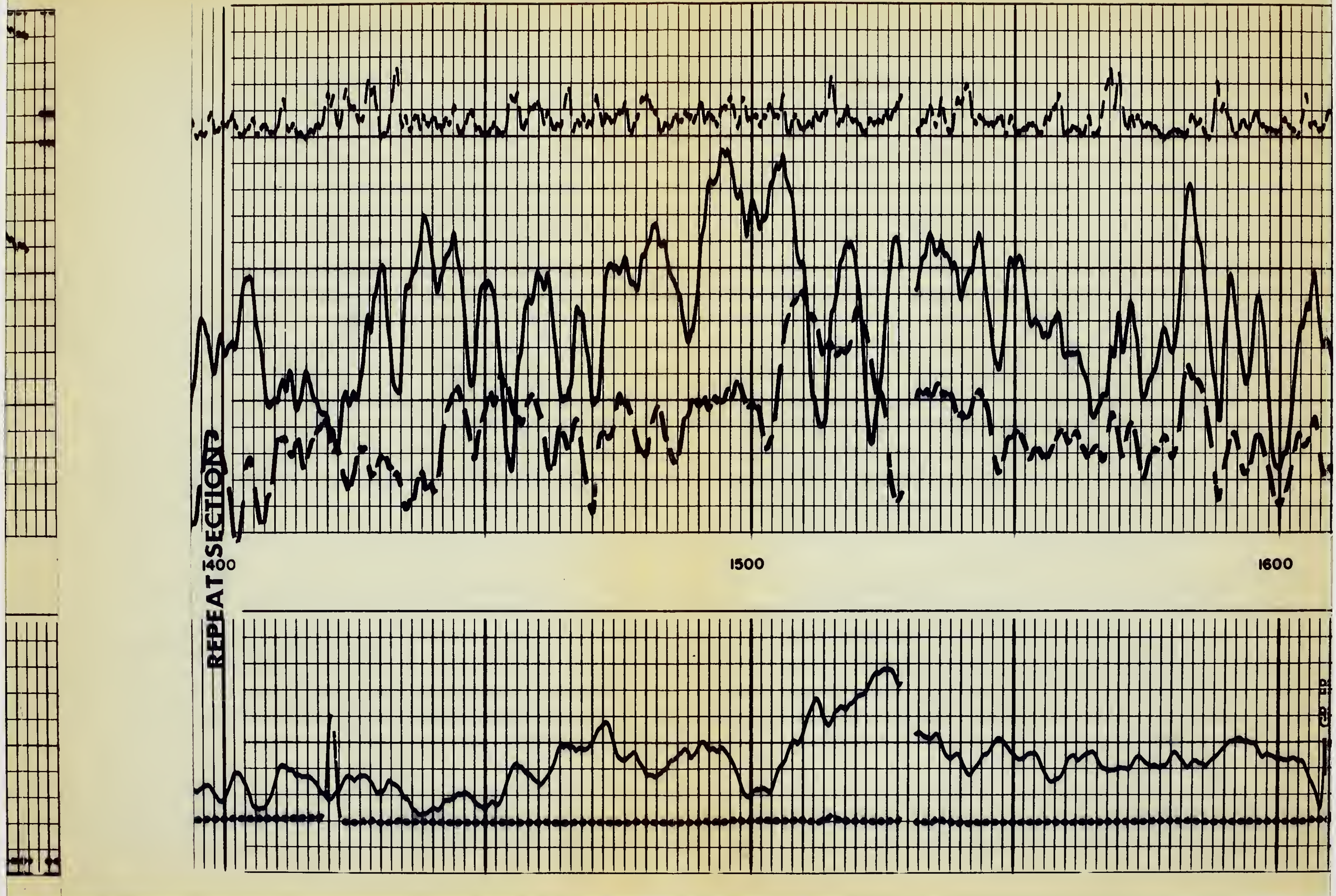

0500
0600

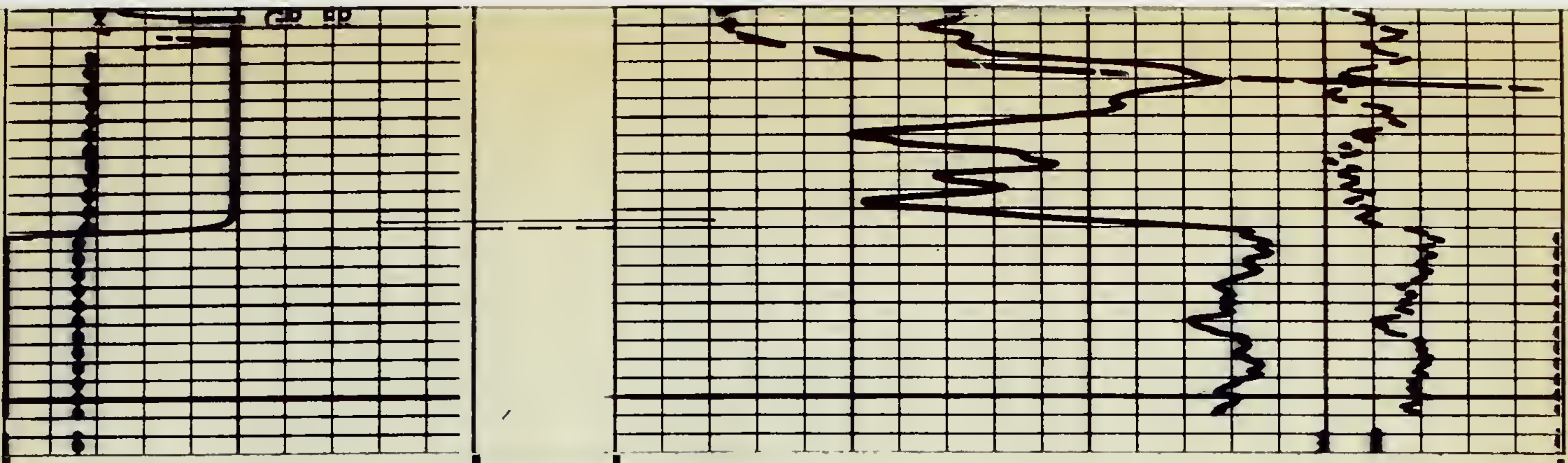

0700
0800
0900


1000
1100


1200
1300
1400


BULK DENSITY
COMPENSATION
RATIO
1500
1600
Caliper Curve
Gamma Ray
GR FR


REPEAT SECTION
1400
1500
1600



0 150

1.7 2.2 2.7

RATIO

5.0 2.5 0

GAMMA RAY
API UNITS

BULK DENSITY
GRAMS/CC.

6" 16"

−.25 0 +.25

CORRECTION
GRAMS/CC.

CALIPER
HOLE DIAM. IN INCHES

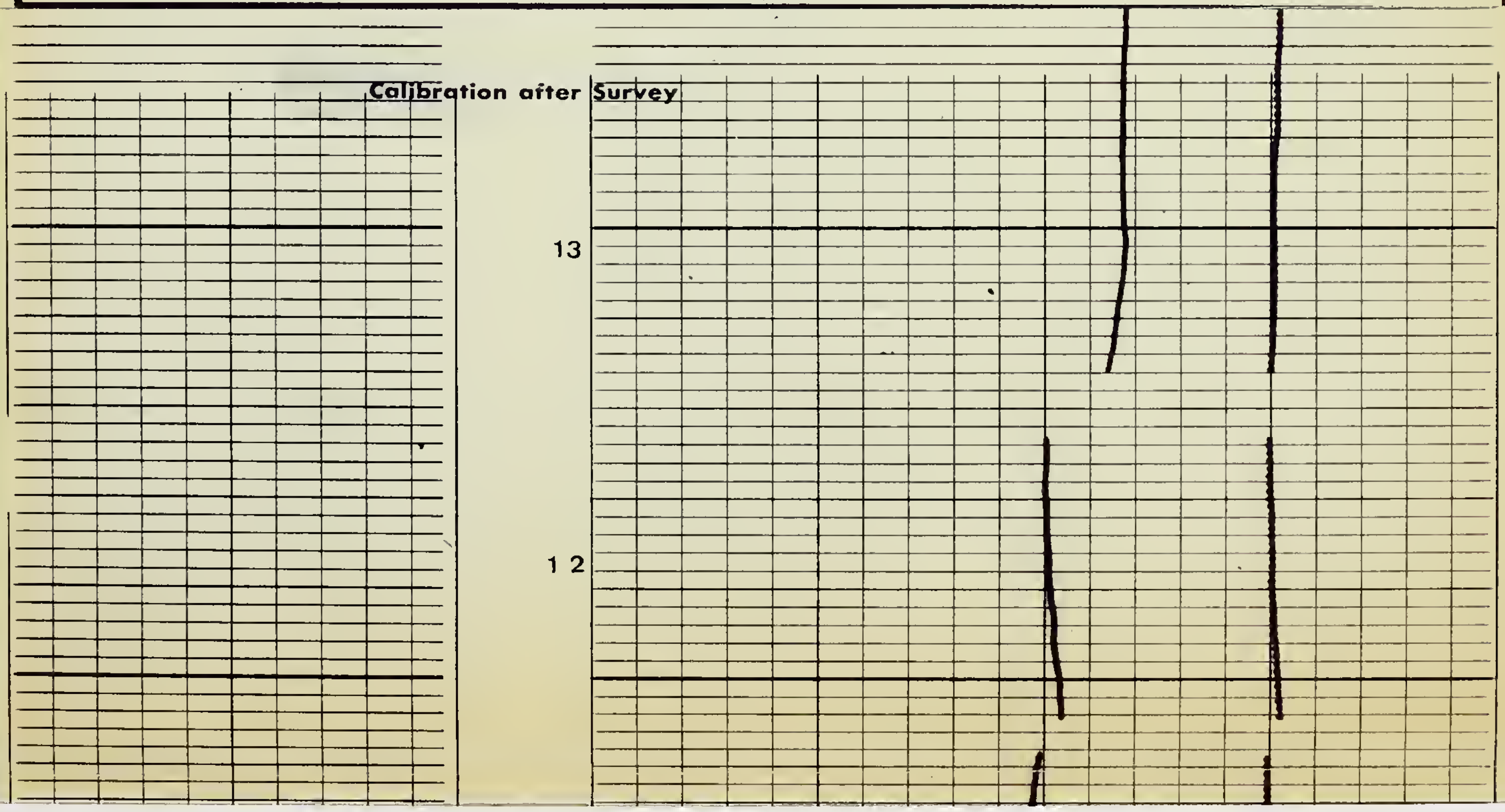
DEPTHS

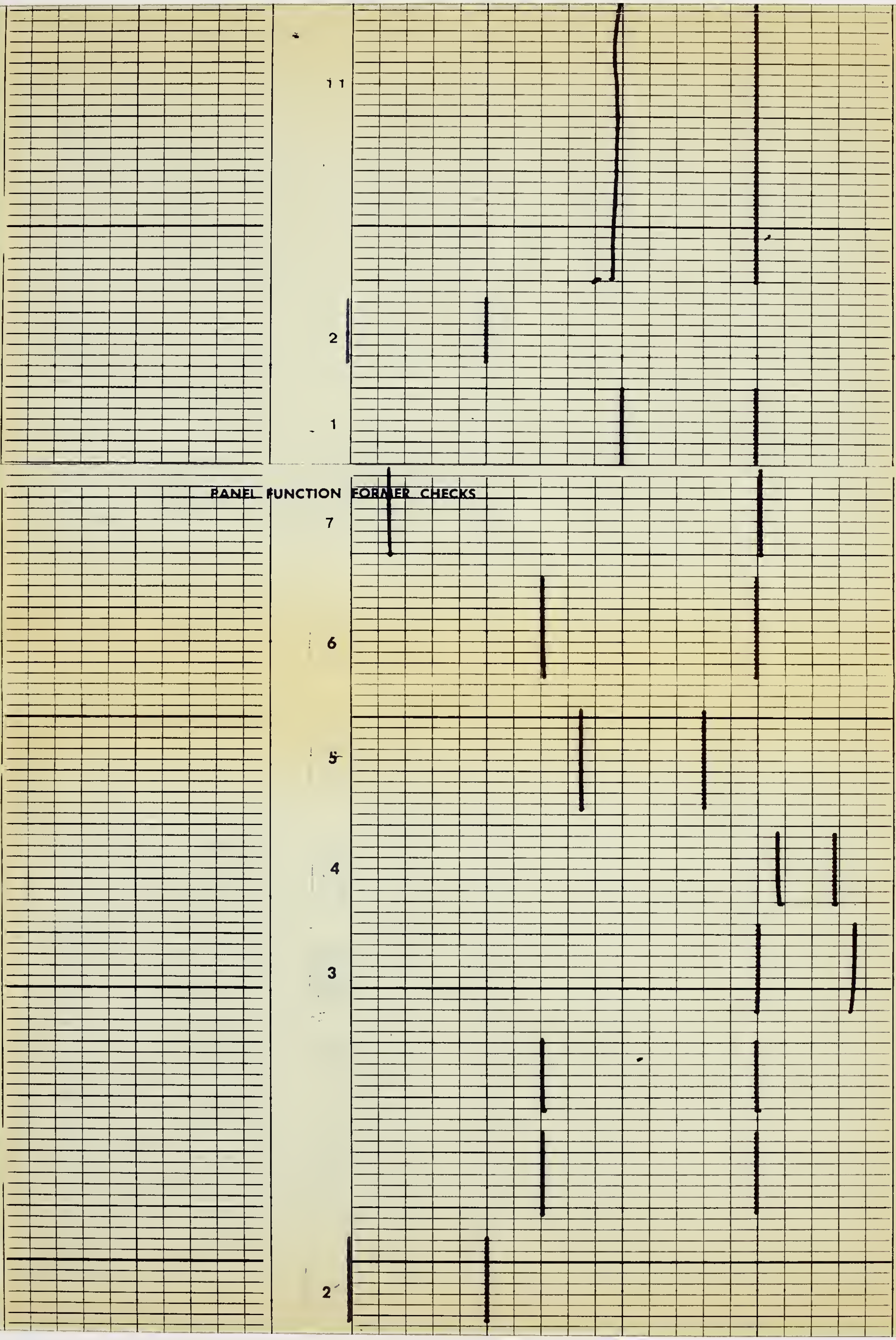
COMPANY ATLANTIC RICHFIELD
WELL SORGHUM 1-D
FIELD
COUNTY RIO BLANCO STATE COLORADO

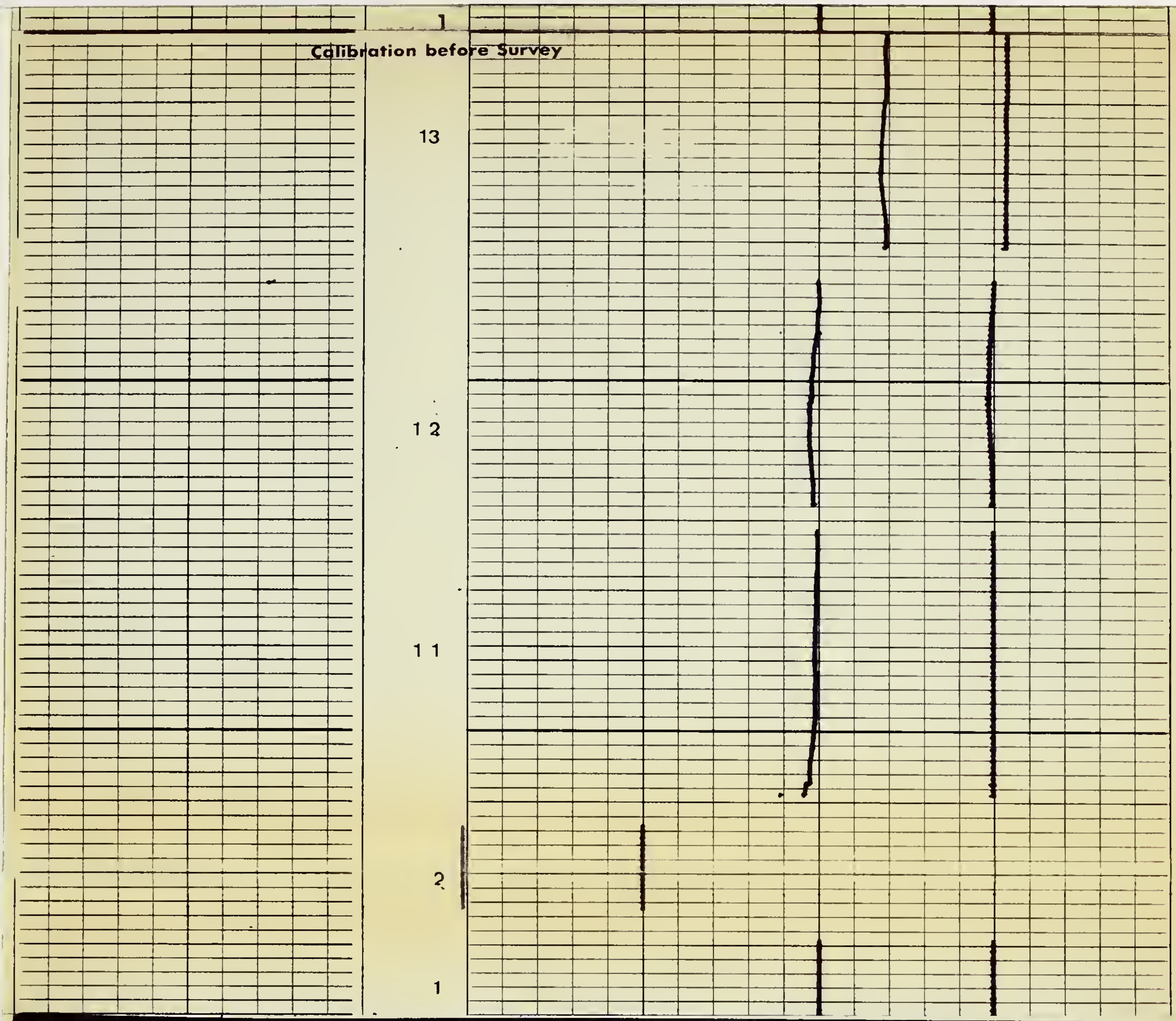
Rm -- @ -- °F
BHT °F

SCHL. FR
SCHL. TD
DRLR TD
Elev:
KB
DF
GL 6903

CALIBRATION RECORD




PANEL FUNCTION FORMER CHECKS
11
2
1
7
6
5
4
3
2



FORMATION DENSITY COMPENSATED CALIBRATION CODING

1. MECHANICAL ZERO
2. RECORDER SENSITIVITY

PANEL TEST

FDC LIQUID

	POS	ρ	$\Delta\rho$
3.	# 1	2.92	.00
4.	# 2	2.78	+.14
5.	# 3	2.42	−.10
6.	# 4	2.35	.00
7.	# 5	2.08	.01

8. MECHANICAL ZERO CALIPER
9. 8" RING
10. 12" RING
11. TOOL CALIBRATE #1 SET $\rho = 2.50$
12. TOOL CALIBRATE #2 SET $\Delta\rho = .00$
13. LOG POSITION $\rho = 2.59$, $\Delta\rho = .015$

CALIBRATION RECORD

COMPANY ATLANTIC RICHFIELD

WELL SORGHUM 1-D

FIELD

COUNTY RIO BLANCO STATE COLORADO

Rm -- @ -- °F

BHT °F

SCHL. FR

SCHL. TD

DRLR TD

Elev:

KB

DF

GL 6903

Schlumberger

DUAL INDUCTION - LATEROLOG
WITH LINEAR CORRELATION LOG

COUNTY RIO BLANCO
FIELD or LOCATION
WELL SORGHUM GULCH 1-D
COMPANY ATLANTIC RICHFIELD

COMPANY ATLANTIC RICHFIELD
ET AL
WELL SORGHUM GULCH 1-D
FIELD --
COUNTY RIO BLANCO STATE COLORADO

Location. API Serial No. 7108
1515 W LINE 1511 S LINE
Sec. 7 Twp. 3S Rge. 96W

Other Services:
BHC, FDC, CNL, GR, TEMP.

Permanent Datum: GL ; Elev.:
Log Measured From GL , 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B. 6903
D.F. 6903
G.L. 6903

Date	7/28/74			
Run No.	ONE			
Depth—Driller	1640			
Depth—Logger	1630			
Btm. Log Interval	1624			
Top Log Interval	60			
Casing—Driller	8 5/8 @ 60	@	@	@
Casing—Logger	60			
Bit Size	7 7/8			
Type Fluid in Hole				
Fluid Level	AIR MIST			
Dens. | Visc.	-- | --	|	|	|
pH | Fluid Loss	-- | -- ml	| ml	| ml	| ml
Source of Sample	-- --			
R_m @ Meas. Temp.	-- @ -- °F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	-- @ -- °F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	-- @ -- °F	@ °F	@ °F	@ °F
Source: R_{mf} | R_{mc}	-- | --	|	|	|
R_m @ BHT	-- @ 90 °F	@ °F	@ °F	@ °F
Time Since Circ.	6 HOURS			
Max. Rec. Temp.	90 °F	°F	°F	°F
Equip. | Location	7674 | VERN	|	|	|
Recorded By	STRAWN			
Witnessed By	MR. TAIT			

SWS-1608-F

The well name, location and borehole reference data were furnished by the customer.

FOLD HERE

SCALE CHANGES

Type Log	Depth	Scale Up Hole	Scale Down Hole

CHANGES IN MUD TYPE OR ADDITIONAL SAMPLES

Date | Sample No.		
Depth - Driller		
Type Fluid in Hole		
Dens. | Visc.		
ph | Fluid Loss	ml	ml
Source of Sample		
R_m @ Meas. Temp.	@ °F	@ °F
R_{mf} @ Meas. Temp.	@ °F	@ °F
R_{mc} @ Meas. Temp.	@ °F	@ °F
Source: R_{mf} | R_{mc}		
R_m @ BHT	@ °F	@ °F
R_{mf} @ BHT	@ °F	@ °F
R_{mc} @ BHT	@ °F	@ °F

REMARKS
Service Order No. - 7108

☒ Surface determined sonde errors used for 6FF40.
☐ 6FF40 sonde error corrected for borehole signal at R_m = inch
☐ 6FF40 zero set in hole at depth of feet.

EQUIPMENT DATA

Run No.	ONE
Panel No.	322
Cart. No.	234
Sonde No.	169
Mem. Panel No.	172
G.R. Cart No.	98
G.R. Panel No.	173
TTR No.	---
Cent. Device	YES
Stand off - Inches	1 1/2
Time Const. - Sec.	---
Speed - F.P.M.	60

CALIBRATION DATA

CALIBRATION:	BACKGND. CPS.	SOURCE CPS.	GALV. INCR. DIVISION	SENS. TAP (FOR CAL.)	SENS. TAP (RECORD)	TIME CONST.	
GAMMA RAY:							

All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to Clause 7 of our General Terms and Conditions as set out in our current Price Schedule.

SPONTANEOUS-POTENTIAL
MILLIVOLTS

− 20 +

GAMMA RAY
API UNITS

CONDUCTIVITY
MILLIMHOS/M = $\frac{1000}{\text{OHMS. M}^2\text{/M}}$

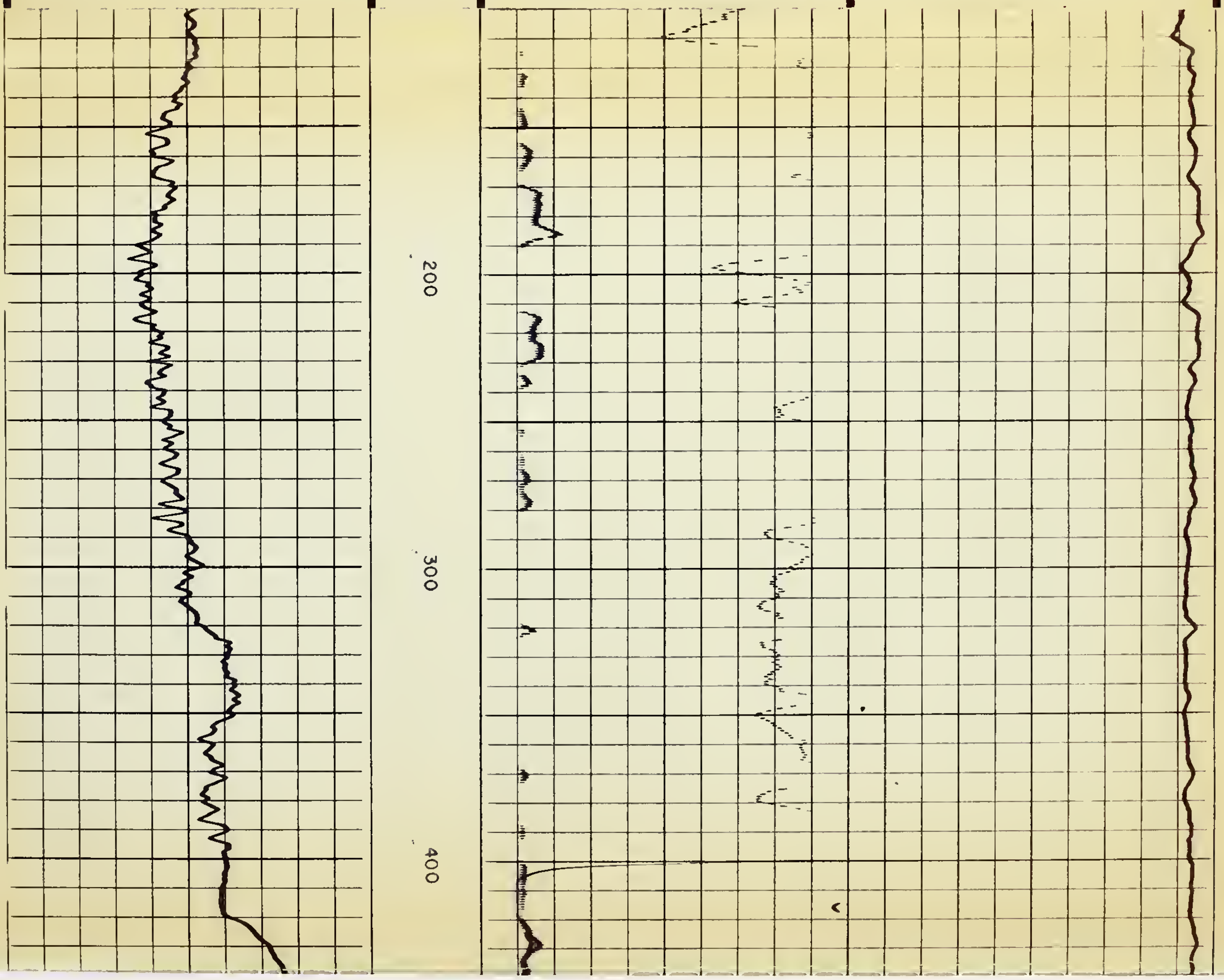
DEEP INDUCTION LOG
400 200 0

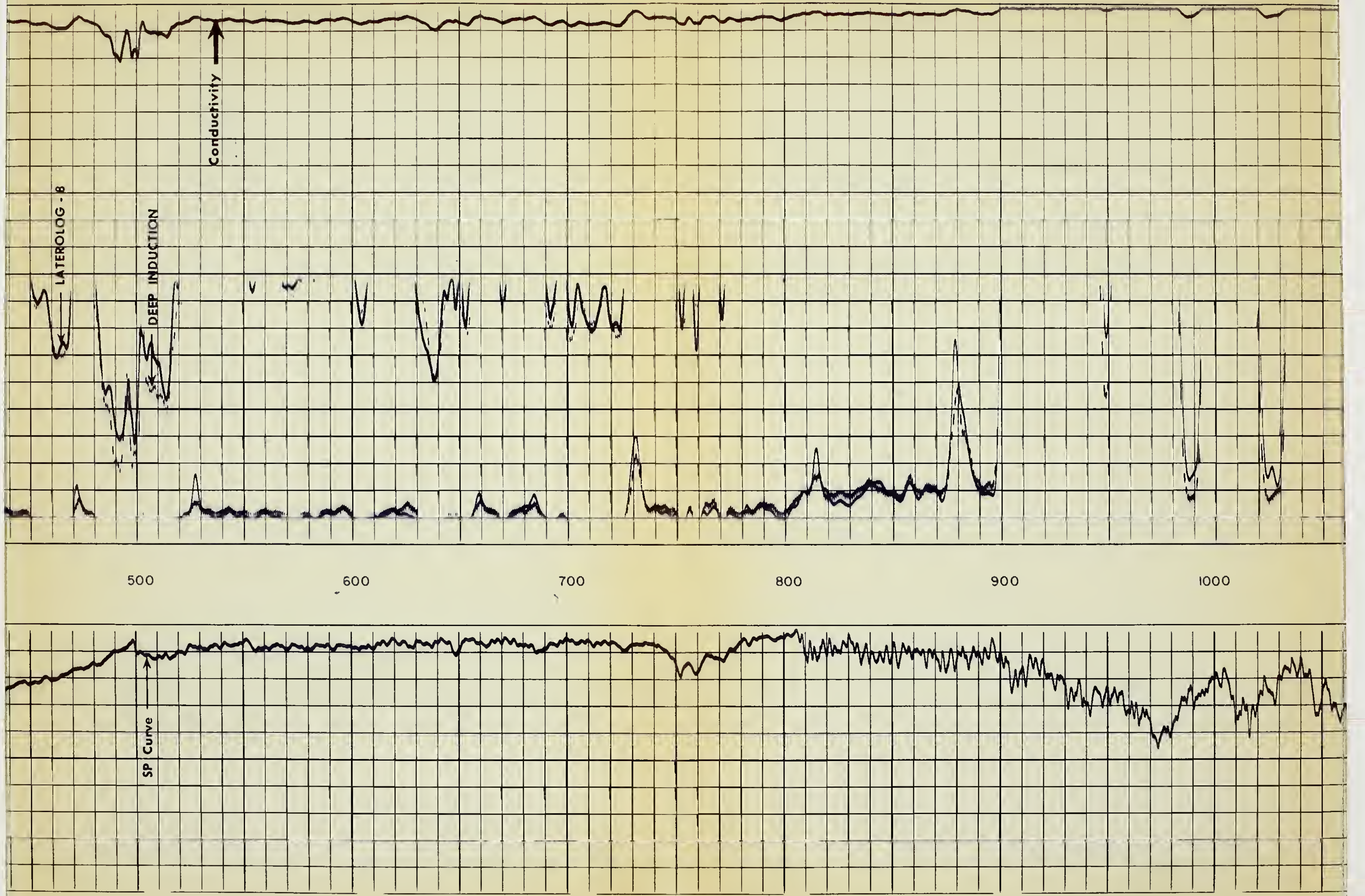
RESISTIVITY
OHMS. M^2/M

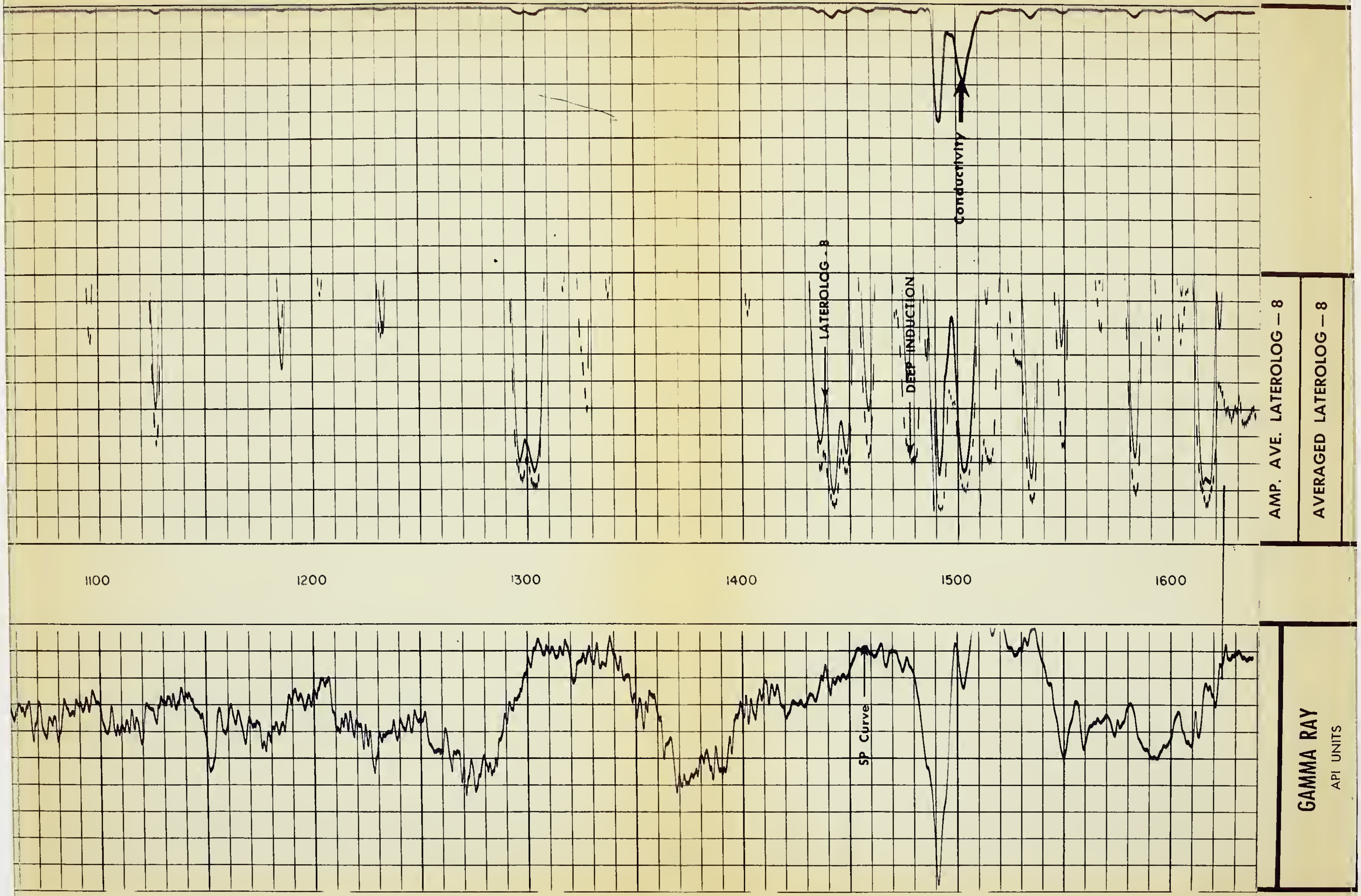
DEEP INDUCTION LOG
0 100
0 1000

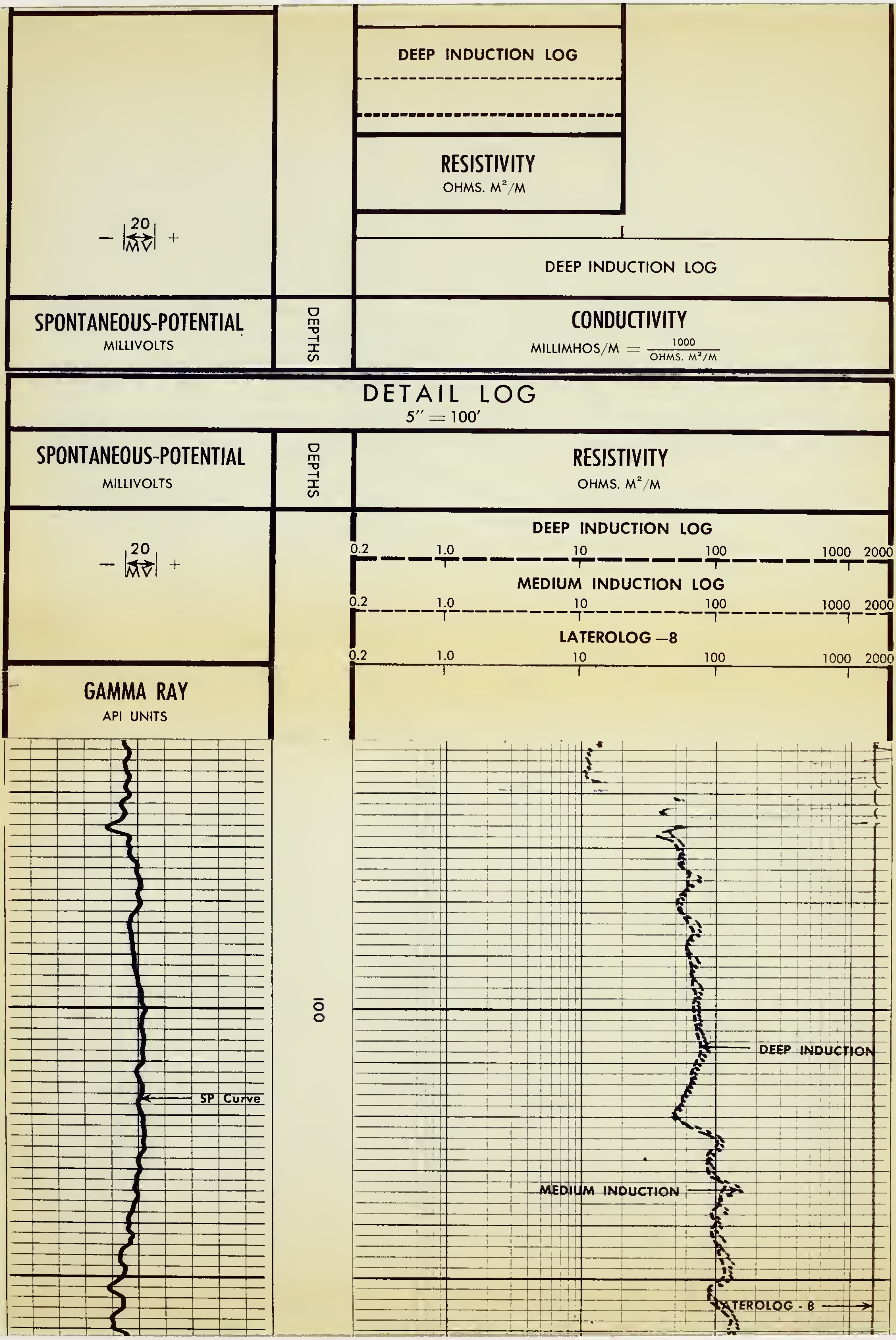
AVERAGED LATEROLOG - 8
0 100
0 1000

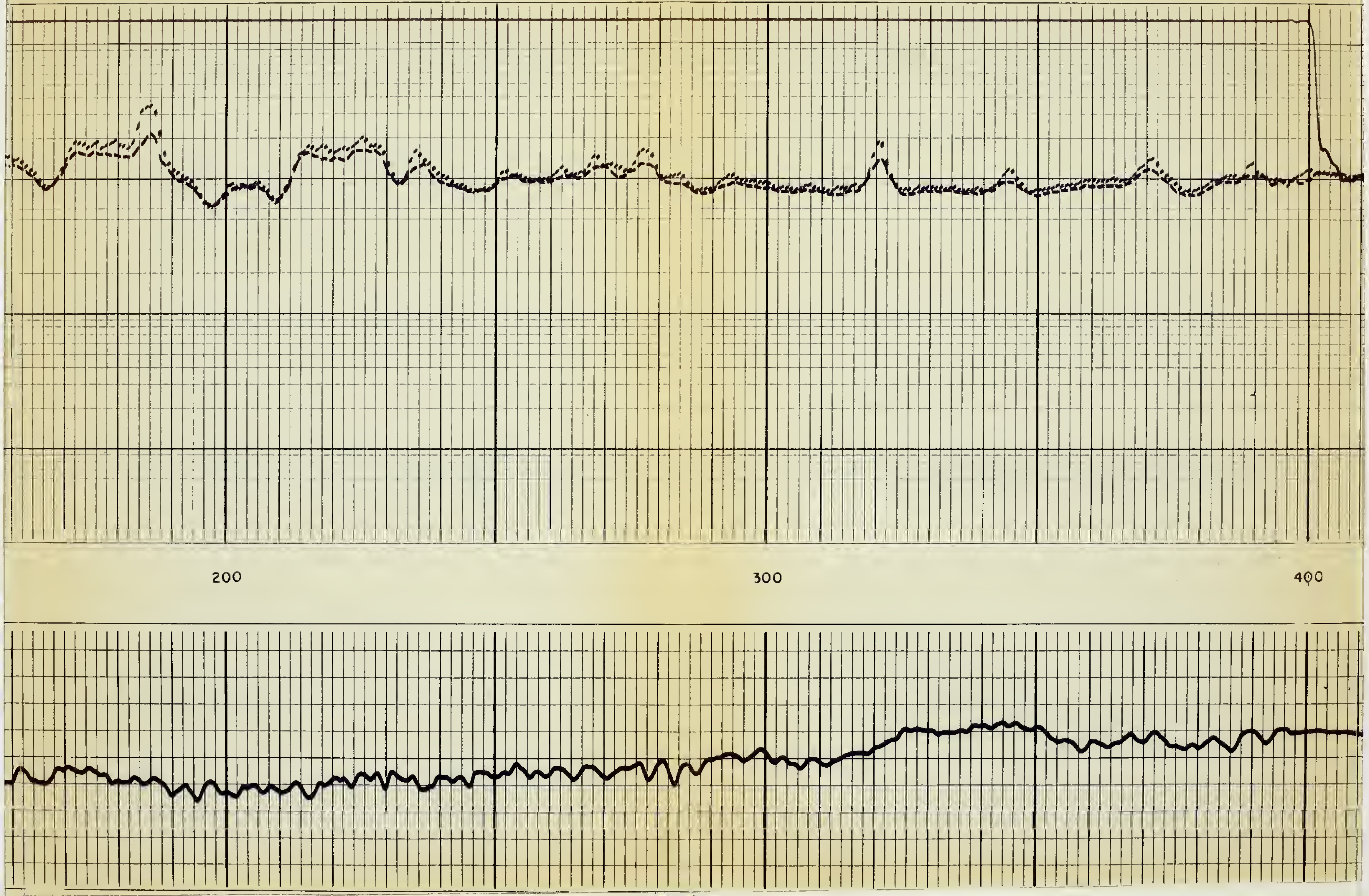
AMP. AVE. LATEROLOG - 8

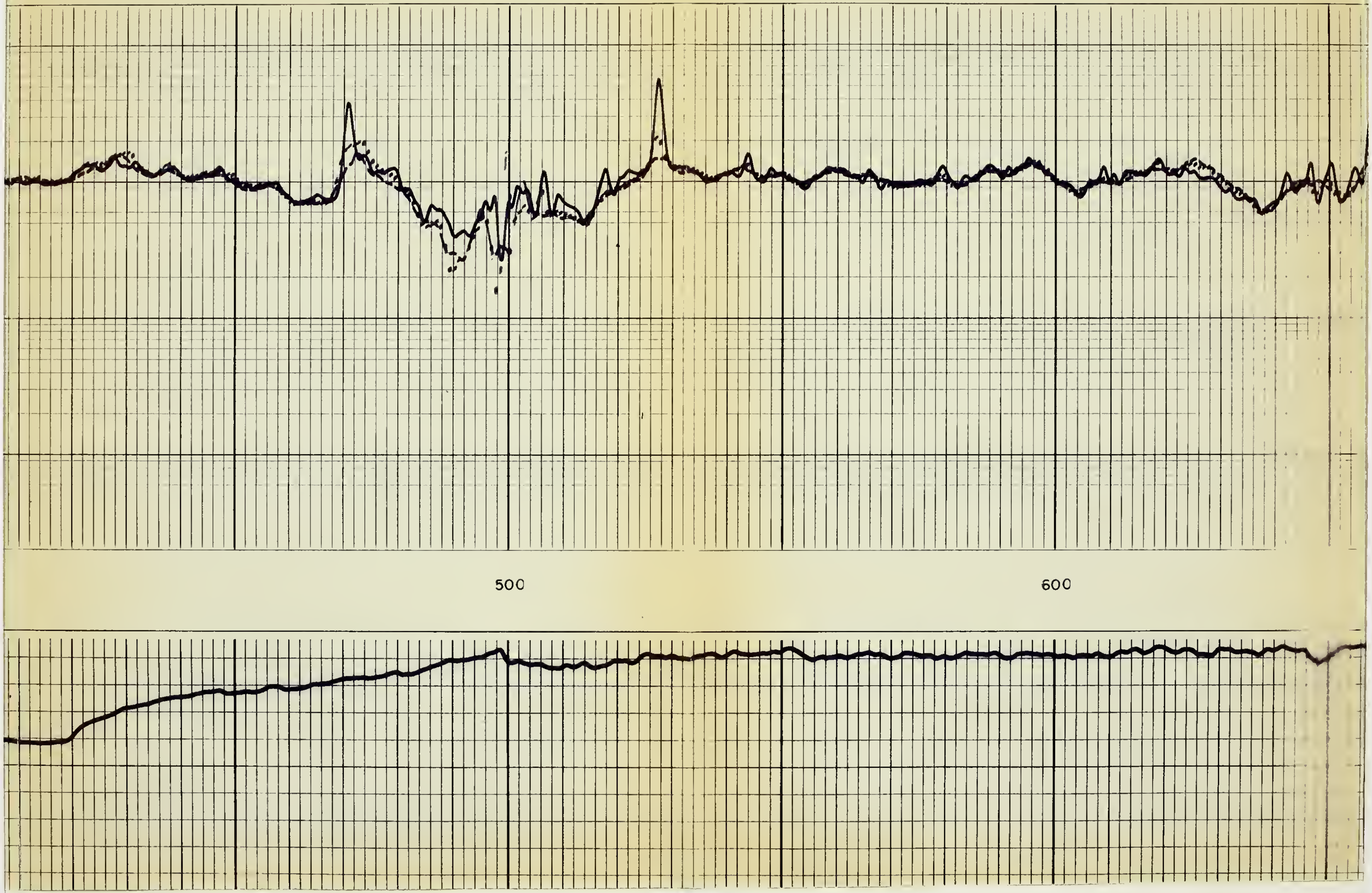


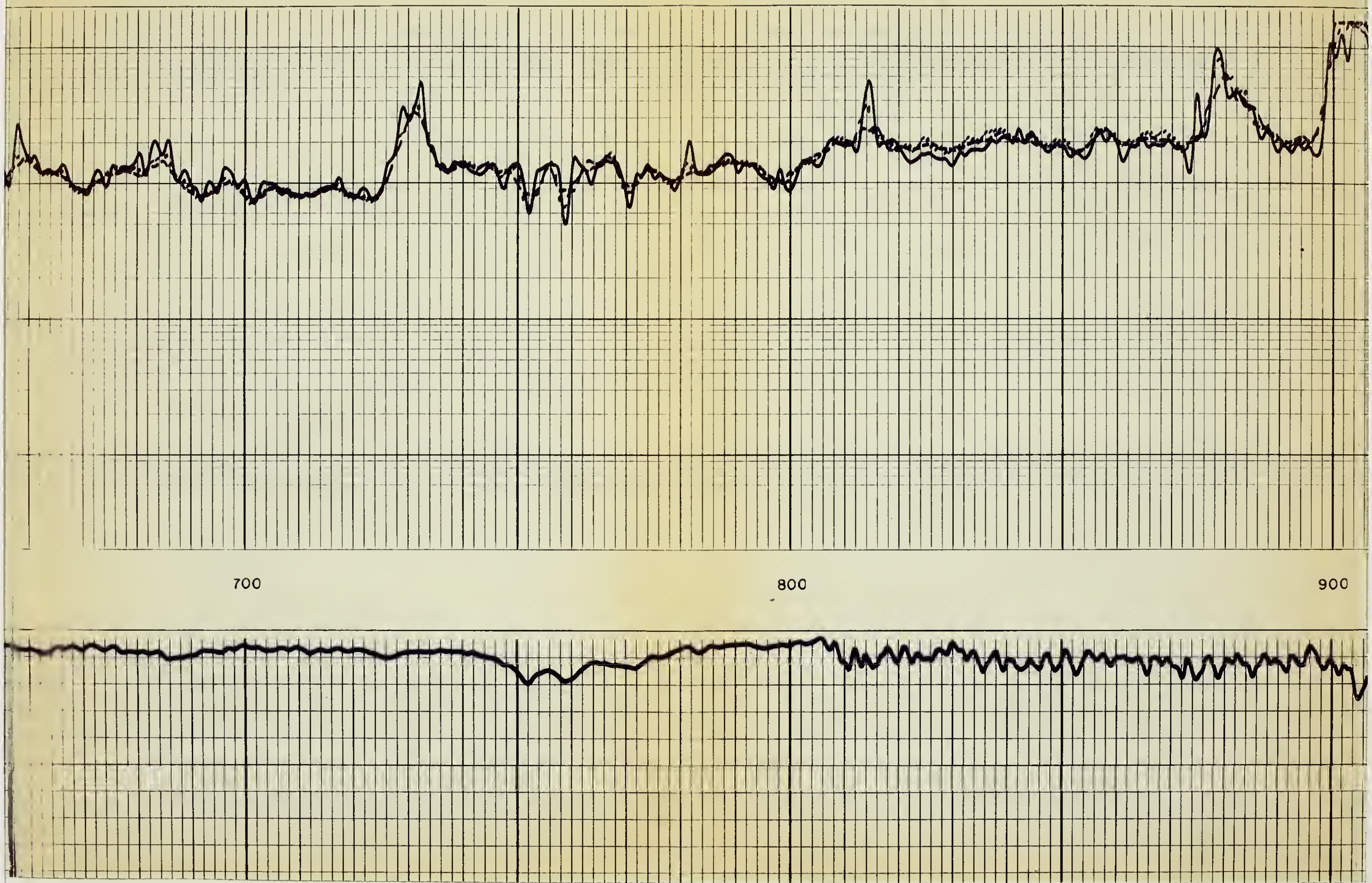

Conductivity
LATEROLOG - 8
DEEP INDUCTION
500
600
700
800
900
1000
SP Curve

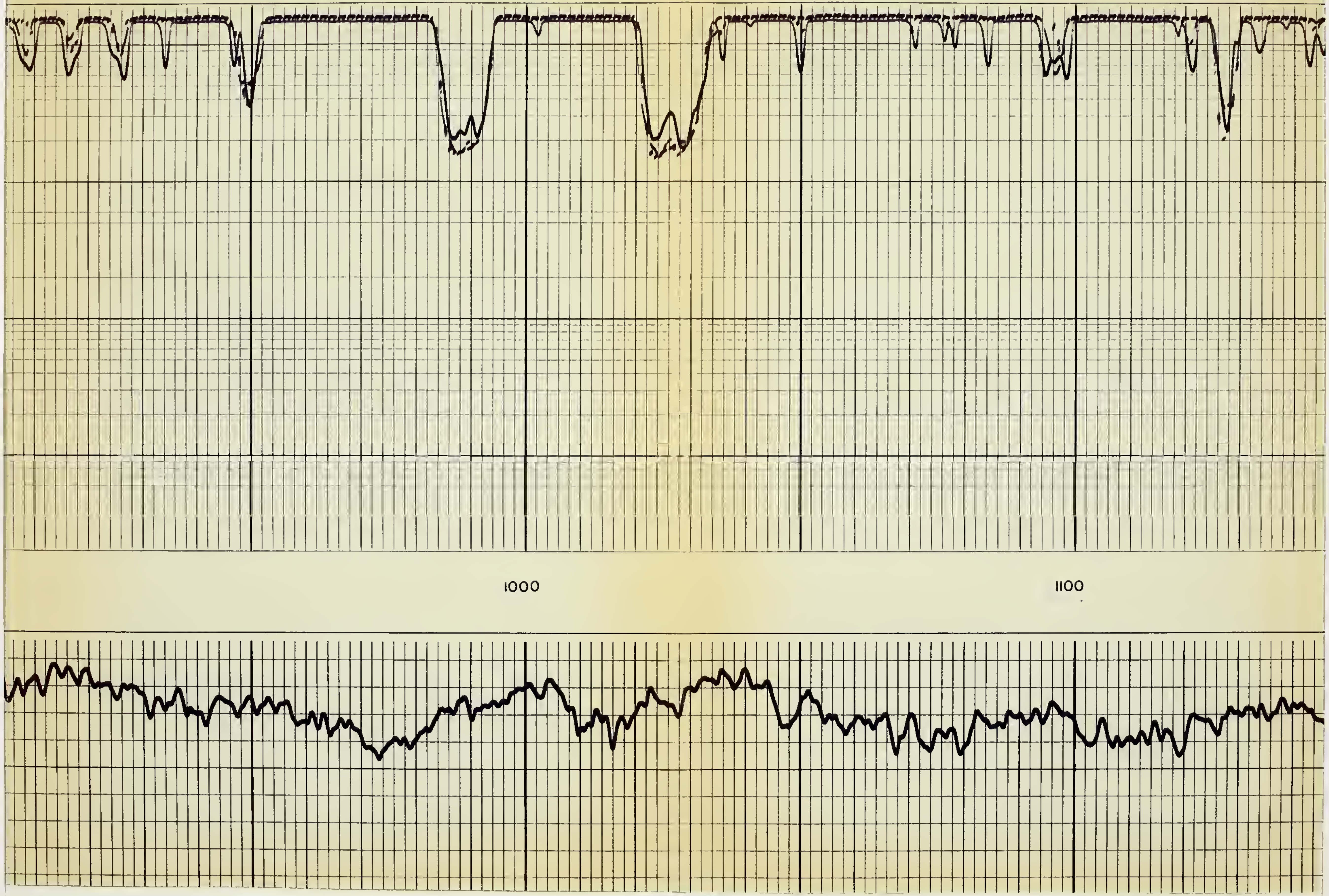

Conductivity
LATEROLOG — 8
DEEP INDUCTION
AMP. AVE. LATEROLOG — 8
AVERAGED LATEROLOG — 8
1100
1200
1300
1400
1500
1600
SP Curve
GAMMA RAY
API UNITS

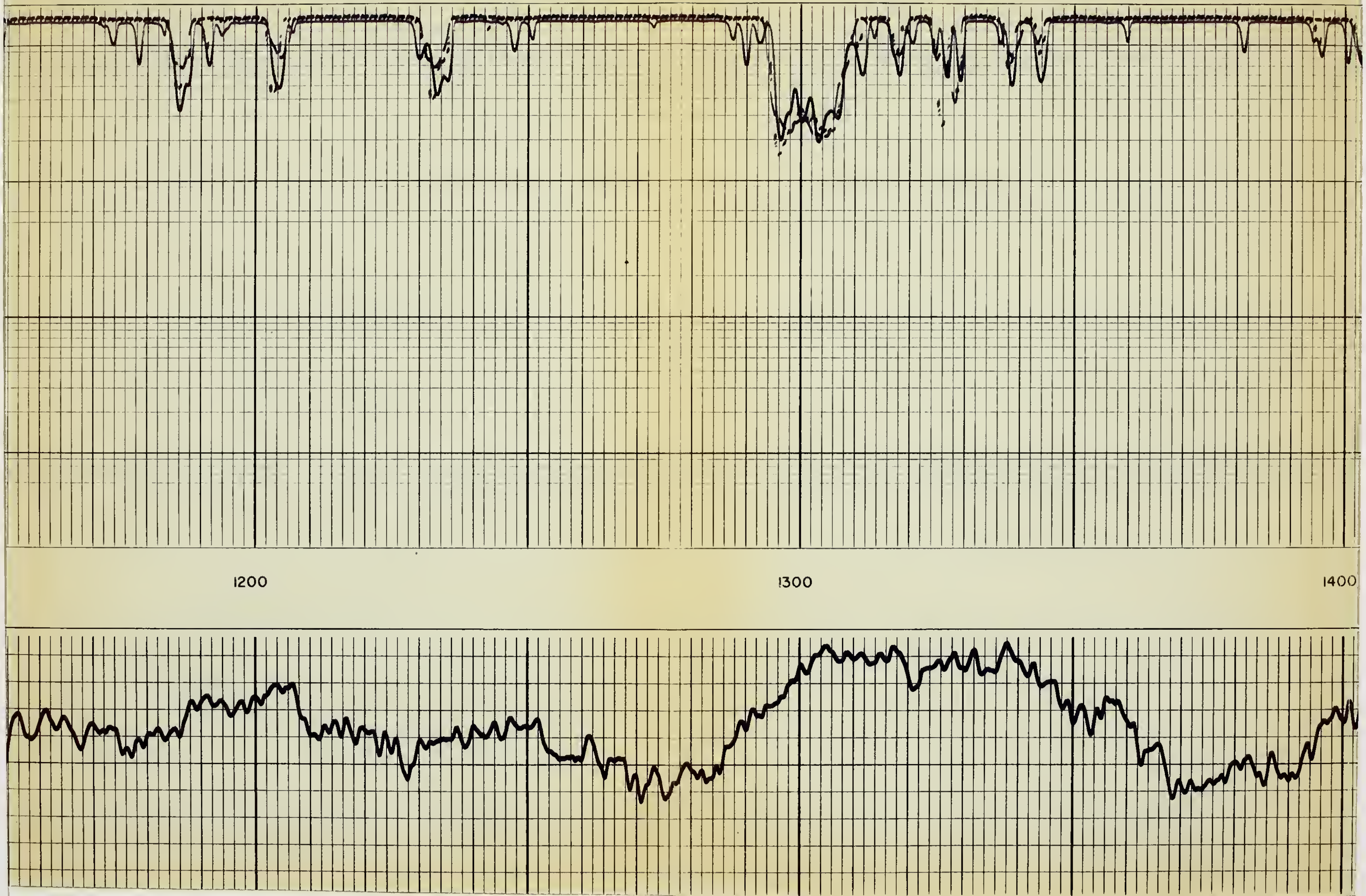

DEEP INDUCTION LOG
RESISTIVITY
OHMS. M²/M
– 20 MV +
DEEP INDUCTION LOG
SPONTANEOUS-POTENTIAL
MILLIVOLTS
DEPTHS
CONDUCTIVITY
MILLIMHOS/M = 1000 / OHMS. M²/M
DETAIL LOG
5″ = 100′
SPONTANEOUS-POTENTIAL
MILLIVOLTS
DEPTHS
RESISTIVITY
OHMS. M²/M
– 20 MV +
DEEP INDUCTION LOG
0.2 1.0 10 100 1000 2000
MEDIUM INDUCTION LOG
0.2 1.0 10 100 1000 2000
LATEROLOG –8
0.2 1.0 10 100 1000 2000
GAMMA RAY
API UNITS
100
DEEP INDUCTION
SP Curve
MEDIUM INDUCTION
LATEROLOG - 8


200
300
400

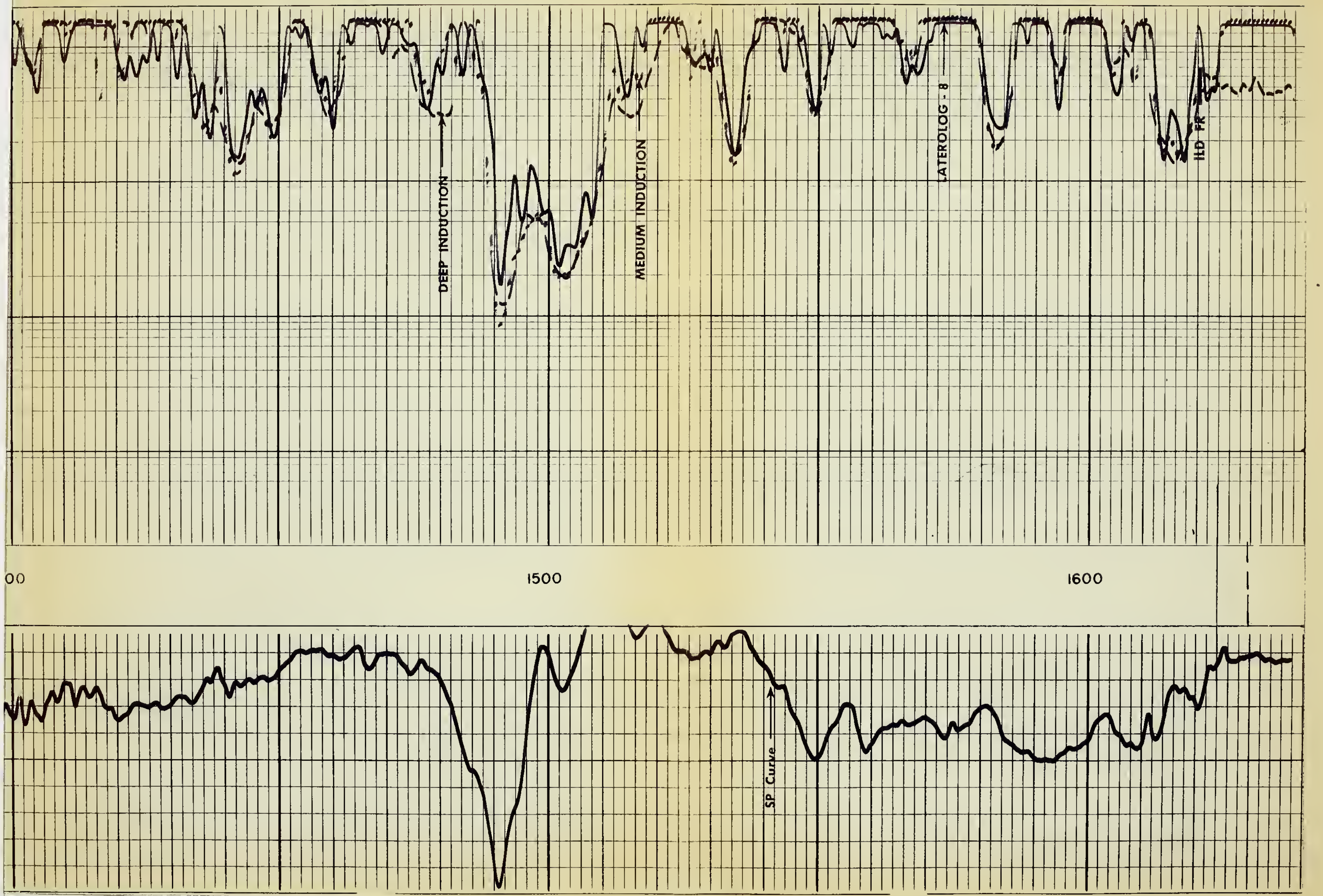

500
600

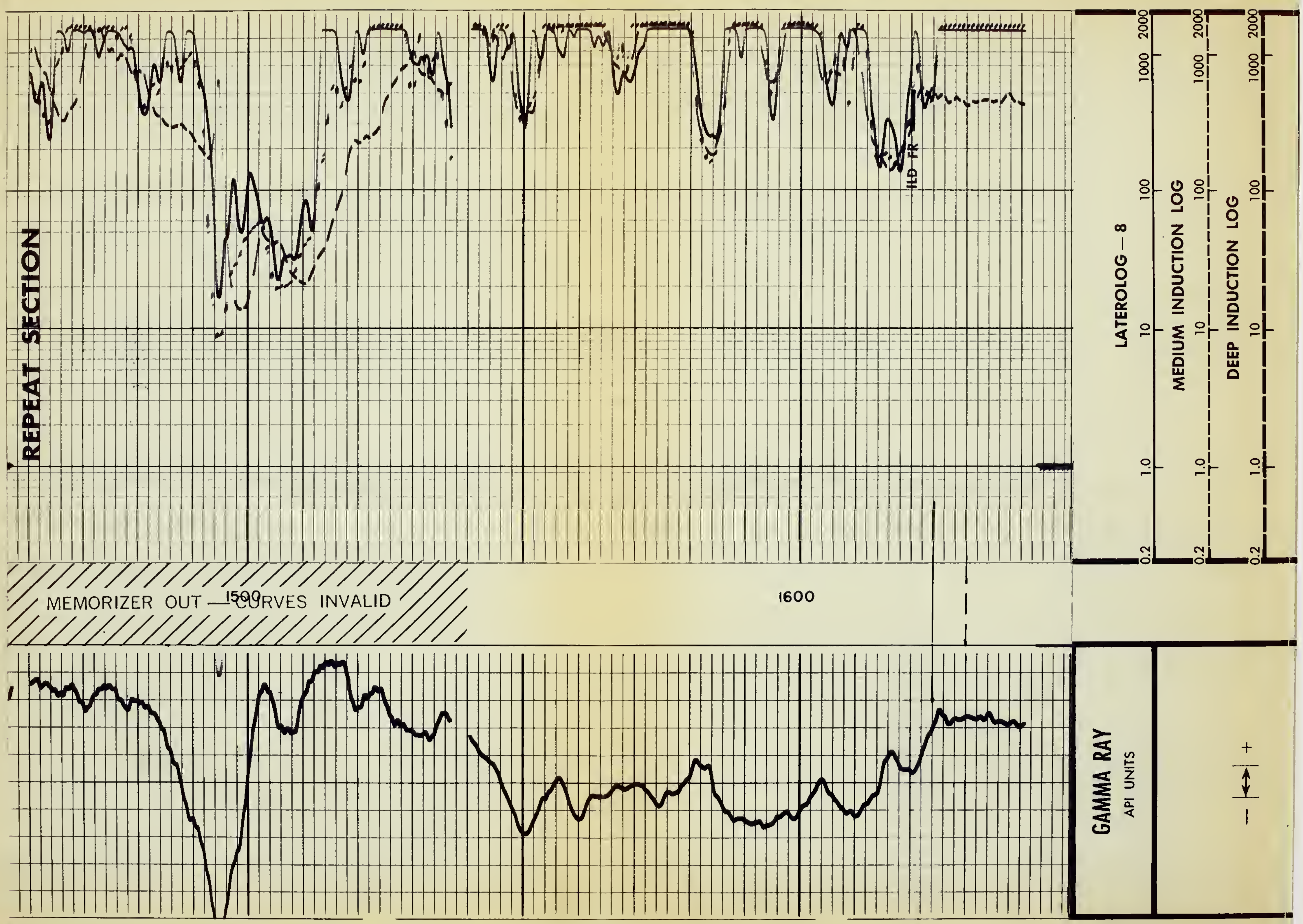

700
800
900


1000
1100



1200
1300
1400


DEEP INDUCTION
MEDIUM INDUCTION
LATEROLOG - 8
ILD FR
00
1500
1600
SP Curve


REPEAT SECTION
ILD
FR
MEMORIZER OUT — CURVES INVALID
1500
1600
LATEROLOG — 8
MEDIUM INDUCTION LOG
DEEP INDUCTION LOG
0.2
1.0
10
100
1000
2000
GAMMA RAY
API UNITS
+
−

SPONTANEOUS-POTENTIAL
MILLIVOLTS

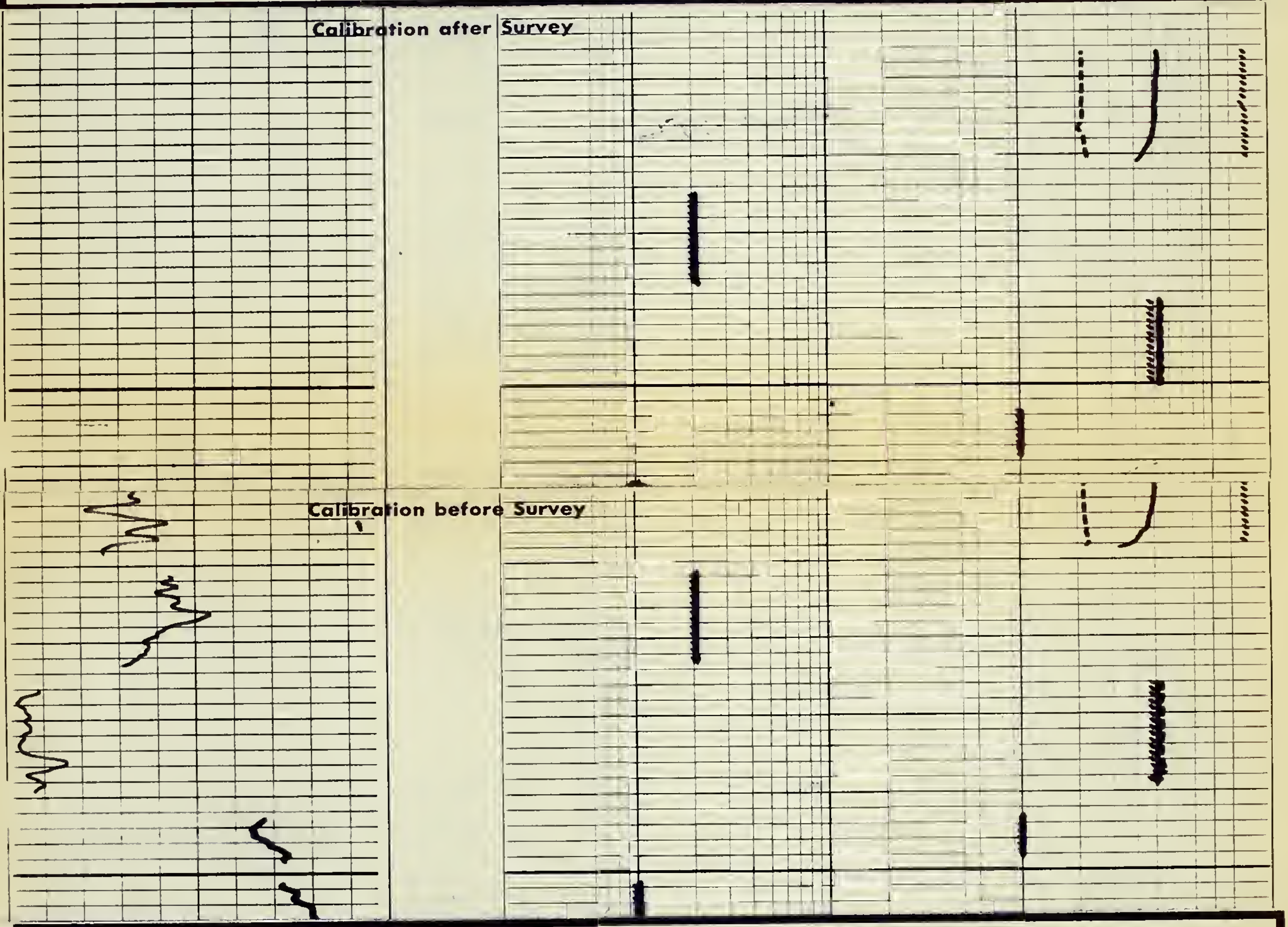
DEPTHS

RESISTIVITY
OHMS. M²/M

COMPANY ATLANTIC RICHFIELD
WELL SORGHUM GULCH 1-D
FIELD --
COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 1624
SCHL. TD 1630
DRLR TD 1640
Elev:
KB 6903
DF 6903
GL 6903

CALIBRATION RECORD



DUAL INDUCTION CALIBRATION FILM CODING

1. MECHANICAL ZERO
2. 1 OHM-M
3. 100 OHM-M
4. ELECTRICAL ZERO (500 OHM-M)
5. 2 OHM-M
6. SONDE ERRORS (+2 MMHO)
7. ZERO SIGNAL IN AIR
8. ILd TEST LOOP (2 OHM SIGNAL)
9. ILm TEST LOOP (2 OHM SIGNAL)
10. Rxo/Rt UNITY
11. Rxo/Rt CALIBRATE

CALIBRATION RECORD

COMPANY ATLANTIC RICHFIELD
WELL SORGHUM GULCH 1-D
FIELD --
COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 1624
SCHL. TD 1630
DRLR TD 1640
Elev:
KB 6903
DF 6903
GL 6903

SWS-1918-B

Schlumberger

SIMULTANEOUS

COMPENSATED NEUTRON-FORMATION DENSITY

COUNTY RIO BLANCO
FIELD or LOCATION
WELL SORGHUM GULCH 1-D
COMPANY ATLANTIC RICHFIELD

COMPANY ATLANTIC RICHFIELD ET AL
WELL SORGHUM GULCH 1-D
FIELD --
COUNTY RIO BLANCO STATE COLORADO

Location: API Serial No. 7108
1515 W LINE 1511 S LINE
Sec. 7 Twp. 3S Rge. 96W

Other Services:
DIL, BHC, GR, TEMP.

Permanent Datum: GL ; Elev.: 6903
Log Measured From GL , Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B. 6903
D.F. 6903
G.L. 6903

Date	7/28/74			
Run No.	ONE			
Depth—Driller	1640			
Depth—Logger	1632			
Btm. Log Interval	1631			
Top Log Interval	60			
Casing—Driller	8 5/8@ 60	@	@	@
Casing—Logger	60			
Bit Size	7 7/8			
Type Fluid in Hole	AIR MIST			
Fluid Level				
Dens. | Visc.				
pH | Fluid Los	ml	ml	ml	ml
Source of Sample				
Rmm @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
Rmf @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
Rmc @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
Source: Rmf | Rmc				
Rm @ BHT	@ 90 °F	@ °F	@ °F	@ °F
Time Since Circ.	8 HOURS			
Max. Rec. Temp.	90 °F	°F	°F	°F
Equip. | Location	7674 | VERN			
Recorded By	STRAWN			
Witnessed By	MR TAIT			

The well name, location and borehole reference data were furnished by the customer.

FOLD HERE

SCALE CHANGES

Type Log	Depth	Scale Up Hole	Scale Down Hole

CHANGES IN MUD TYPE OR ADDITIONAL SAMPLES

Date		
Sample No.		
Depth - Driller		
Type Fluid		
Source of Sample		
Rm @ Meas. Temp.	@ °F	@ °F
Rmf @ Meas. Temp.	@ °F	@ °F
Rmc @ Meas. Temp.	@ °F	
Rm @ BHT	@ °F	
Dens. | Visc.		
ph | Fluid Loss	ml	ml
% Water by Vol.		
% Oil by Vol.		
% Solids by Vol.		
Solids Av. Sp. Gr.		

LOGGING DATA

CNP

Matrix	Auto Hole Size Corr.	Hole Size Setting (if not auto)	Porosity Scale	From	To
LIME	☒ Yes ☐ No		45%	1640	60
	☐ Yes ☐ No				
	☐ Yes ☐ No				
	☐ Yes ☐ No				
	☐ Yes ☐ No				

FDC

Liquid Density	Grain Density	Hole Fluid	Porosity Scale	From	To
1.00	2.71	LIQ	45%	1640	60

EQUIPMENT DATA

Run No.	ONE		
Dens. Pnl.	355		
Dens. Cart	383		
Dens. Skid	549		
Dens. Sde	235		
Dens. Source	2940		
Dens. Calib.	545		
Neut. Pnl.	27		
Neut. Cart	26		
Neut. Source	185		
Neut. Calib	126		
GR Cart	98		
TTR	--		
Mem Pnl.	173		

REMARKS

Service Order No. - 7108

BIT SIZE/CASING DATA

Bit	From	To	Csg. Size	Csg. Wt.	From	To

SWS-1872-E

CALIBRATION DATA

Run No.	Gamma Ray			CNL—Before Log—ACPS		CNL—After Log—ACPS	
	API Scale	Background CPS	Total CPS	Long Spacing	Short Spacing	Long Spacing	Short Spacing
1				432	948	432	948
2	0-150	60	160				
3							
4							
				FDC — Before Log — ACPS		FDC — After Log — ACPS	
1				P_1	P_2	P_1	P_2
2				440	720	440	720
3							
4							

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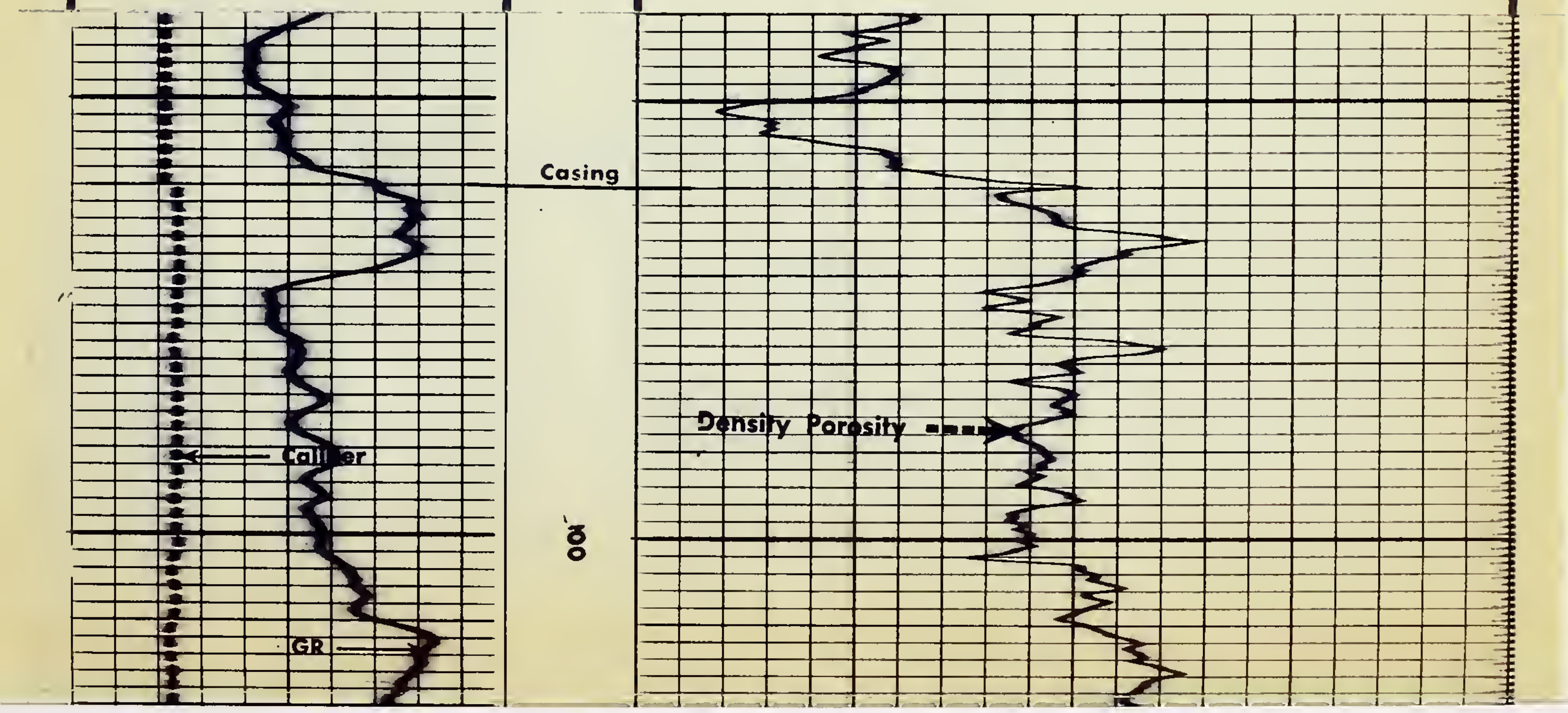
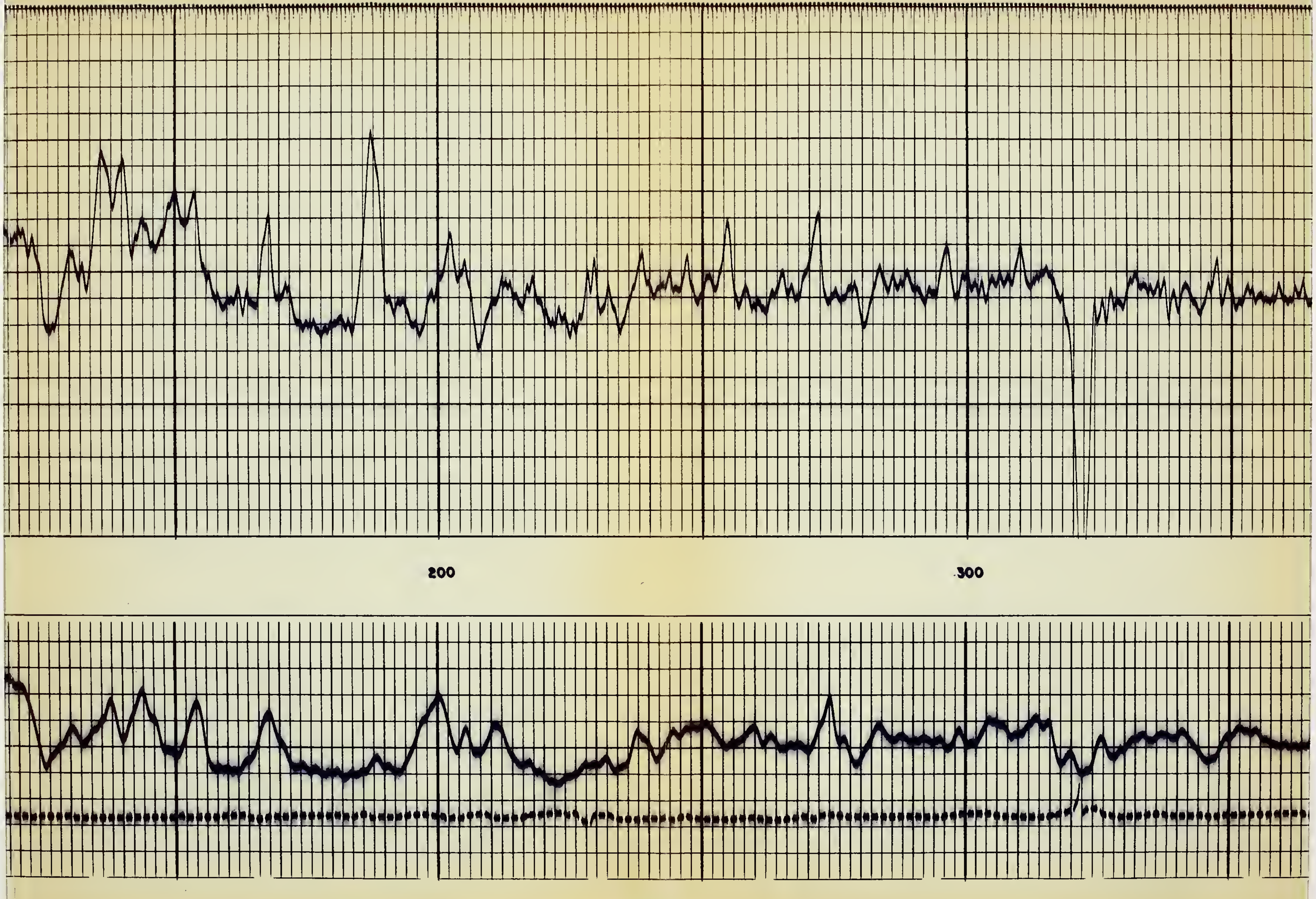
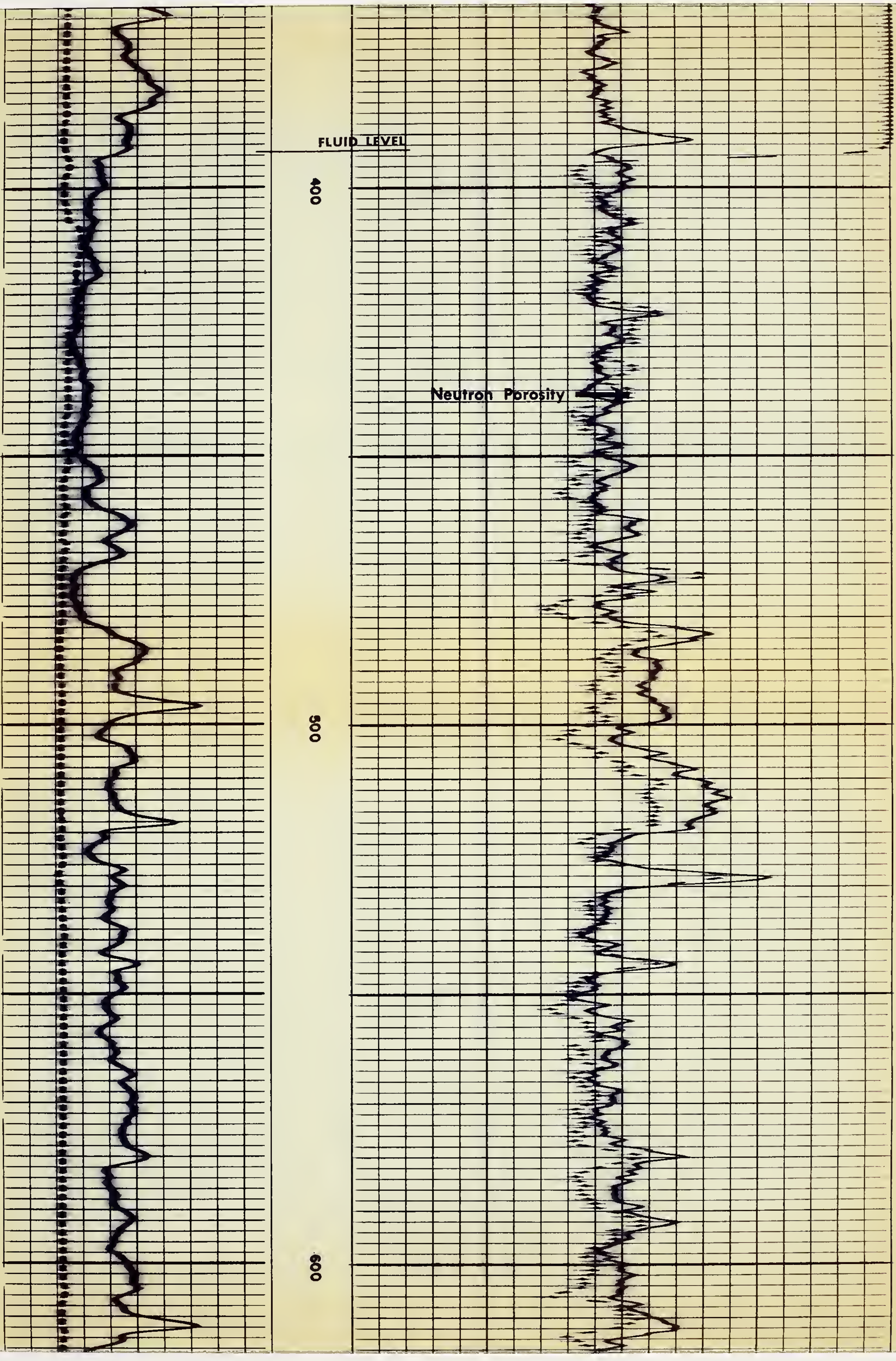
DETAIL LOG

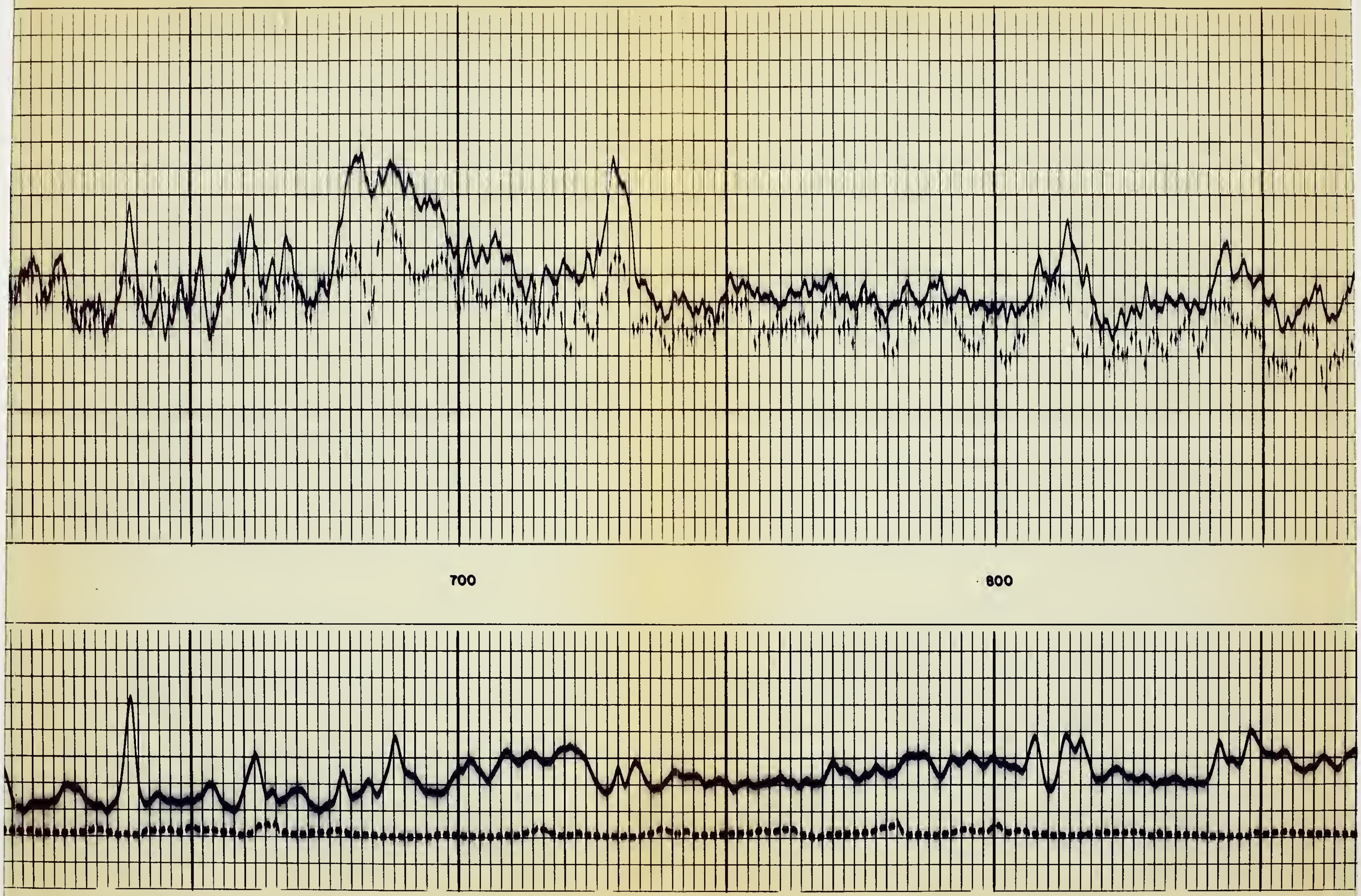
5″ = 100′

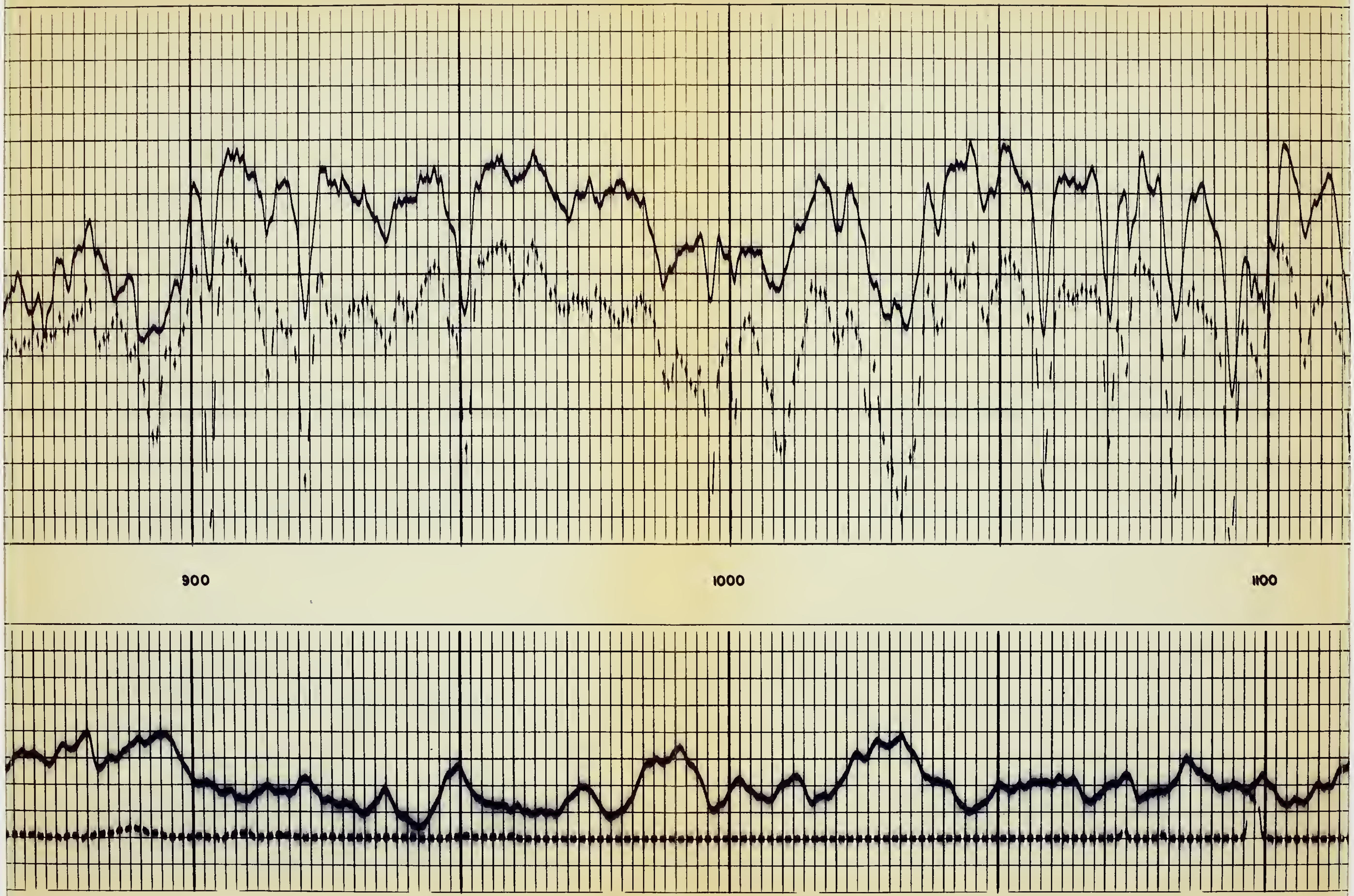
CALIPER HOLE DIAM. IN INCHES	DEPTHS	DENSITY POROSITY INDEX % LIME MATRIX
6″ 16″		60 30 0
GAMMA RAY API UNITS		NEUTRON POROSITY INDEX % LIME MATRIX
0 150		60 30 0

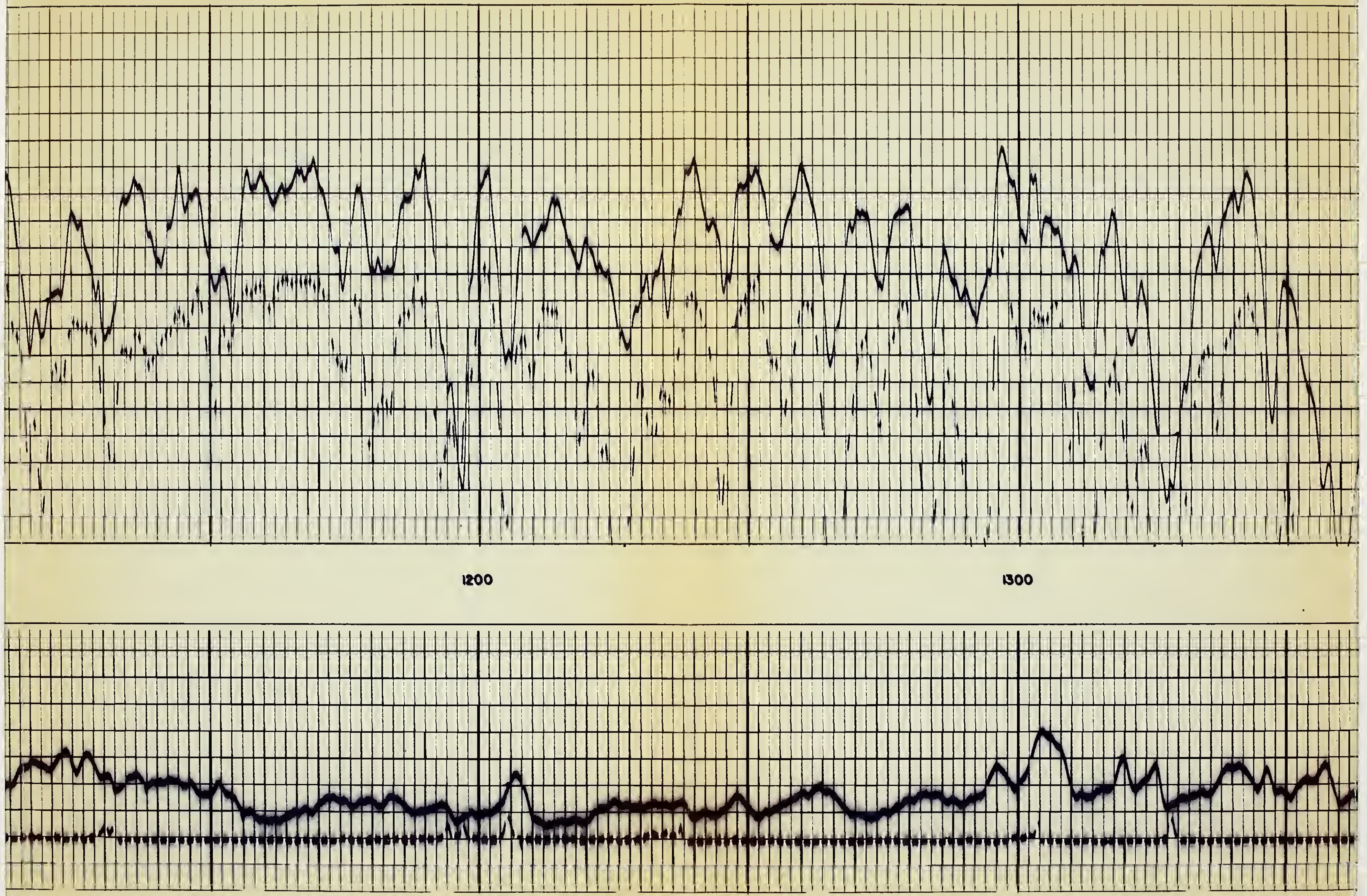


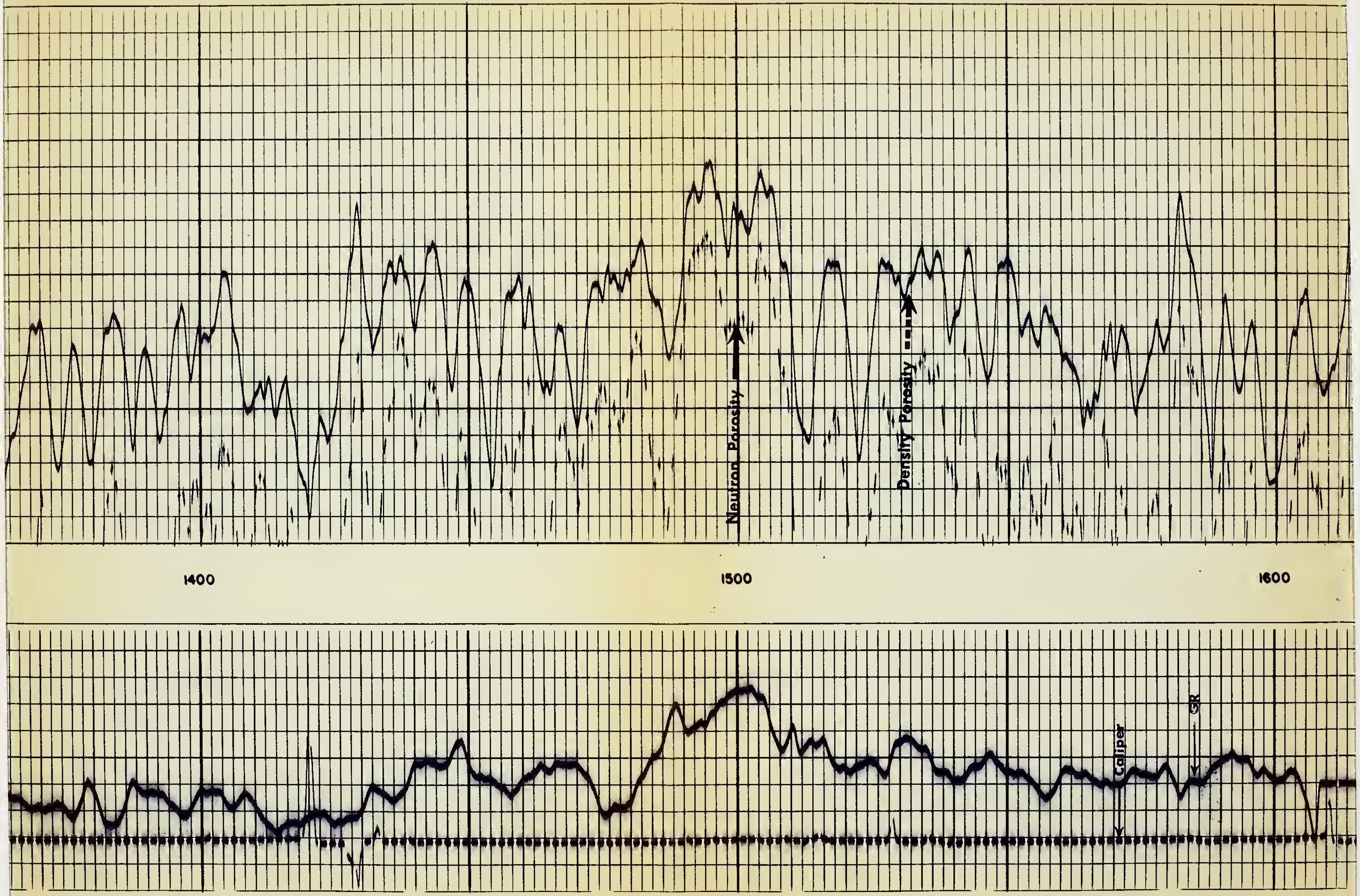

200
300

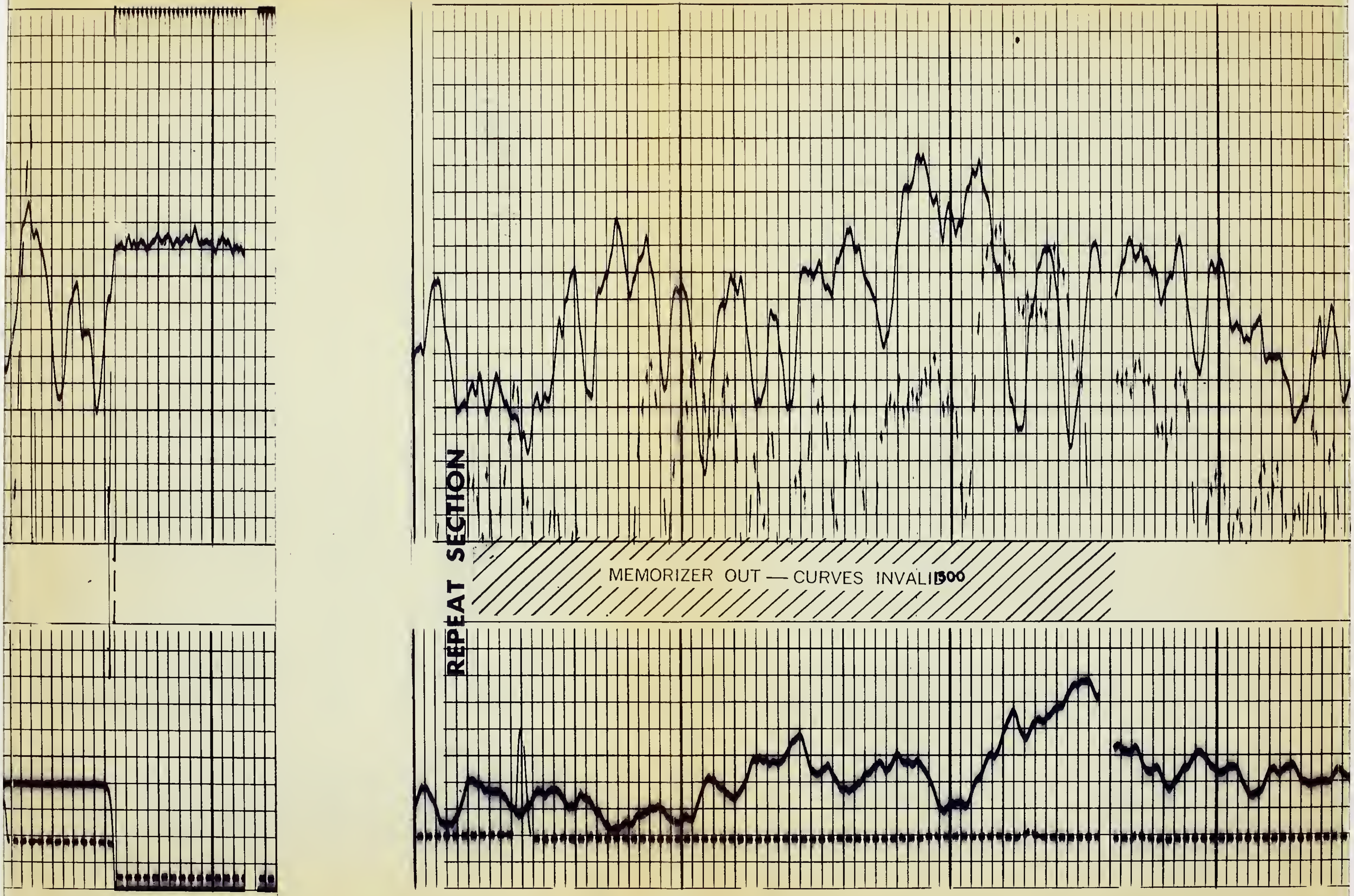

FLUID LEVEL
400
Neutron Porosity
500
600

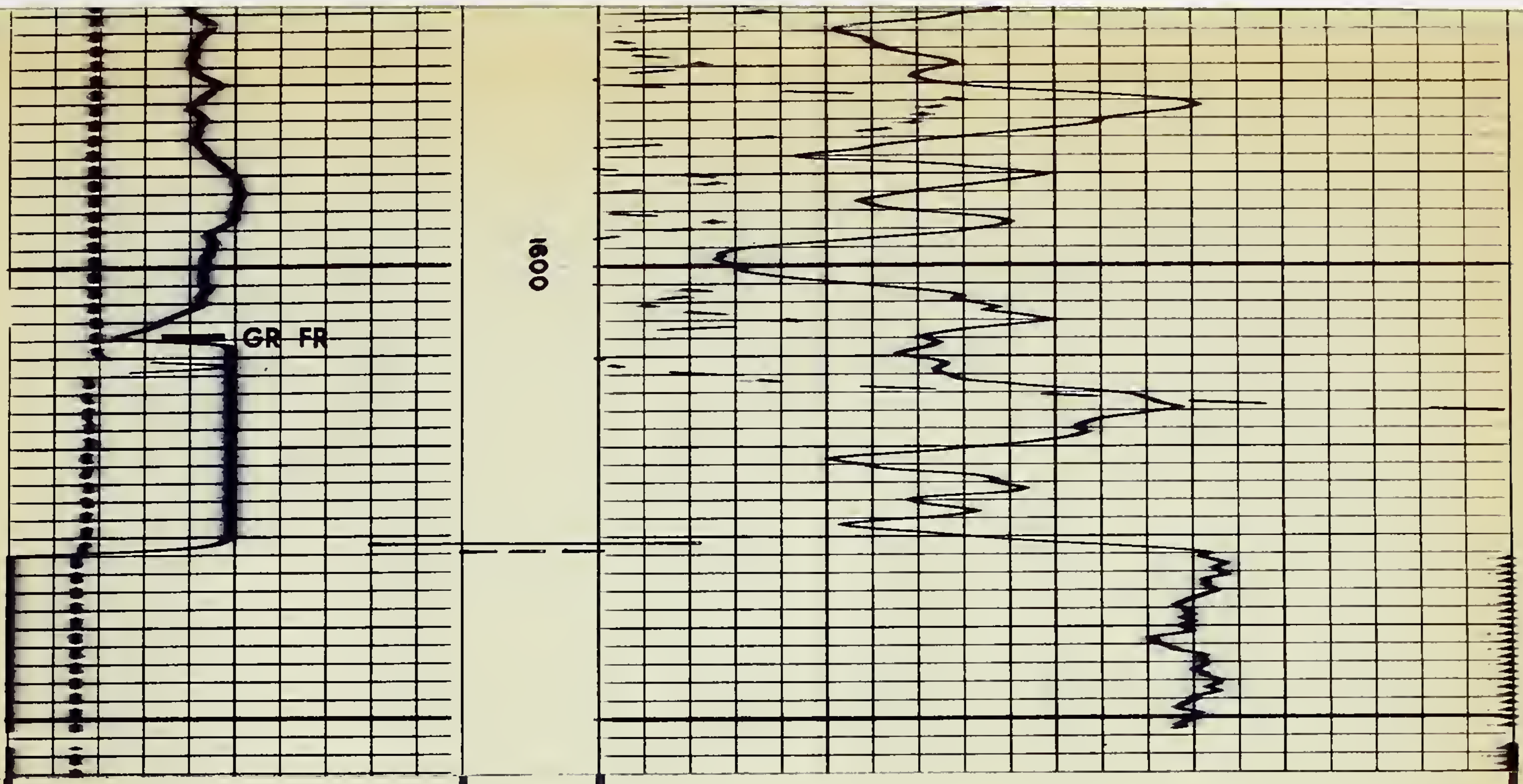

700
800


900
1000
1100


1200
1300


Neutron Porosity
Density Porosity
1400
1500
1600
Caliper
GR


REPEAT SECTION
MEMORIZER OUT — CURVES INVALID
500



GAMMA RAY API UNITS		30 20 10 0 –10 NEUTRON POROSITY INDEX % ________ MATRIX
CALIPER HOLE DIAM. IN INCHES	DEPTHS	30 20 10 0 –10 DENSITY POROSITY INDEX % ________ MATRIX

COMPANY ATLANTIC RICHFIELD

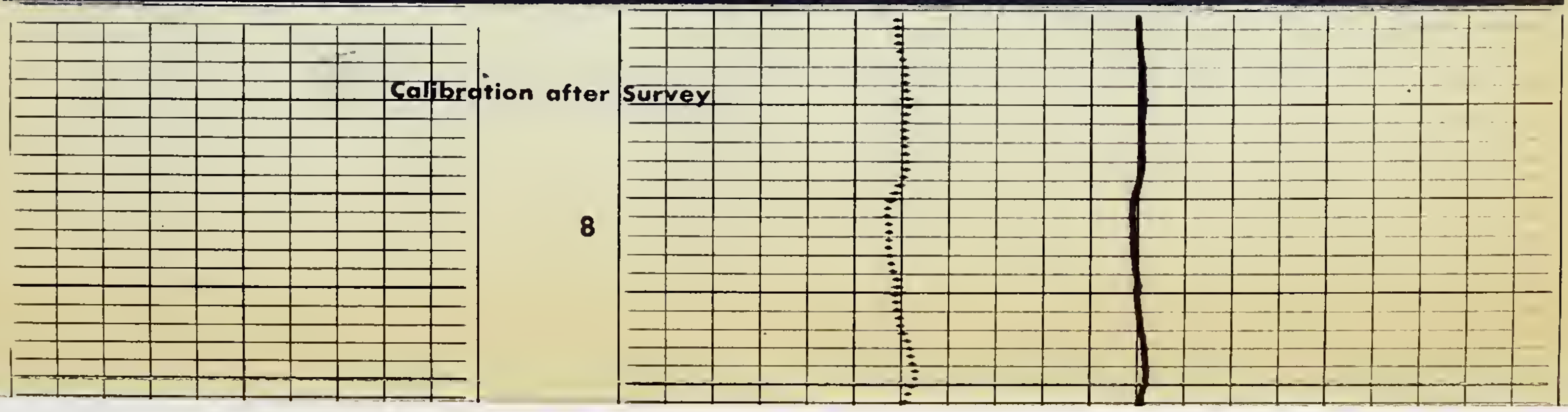
WELL SORGHUM GULCH 1-D

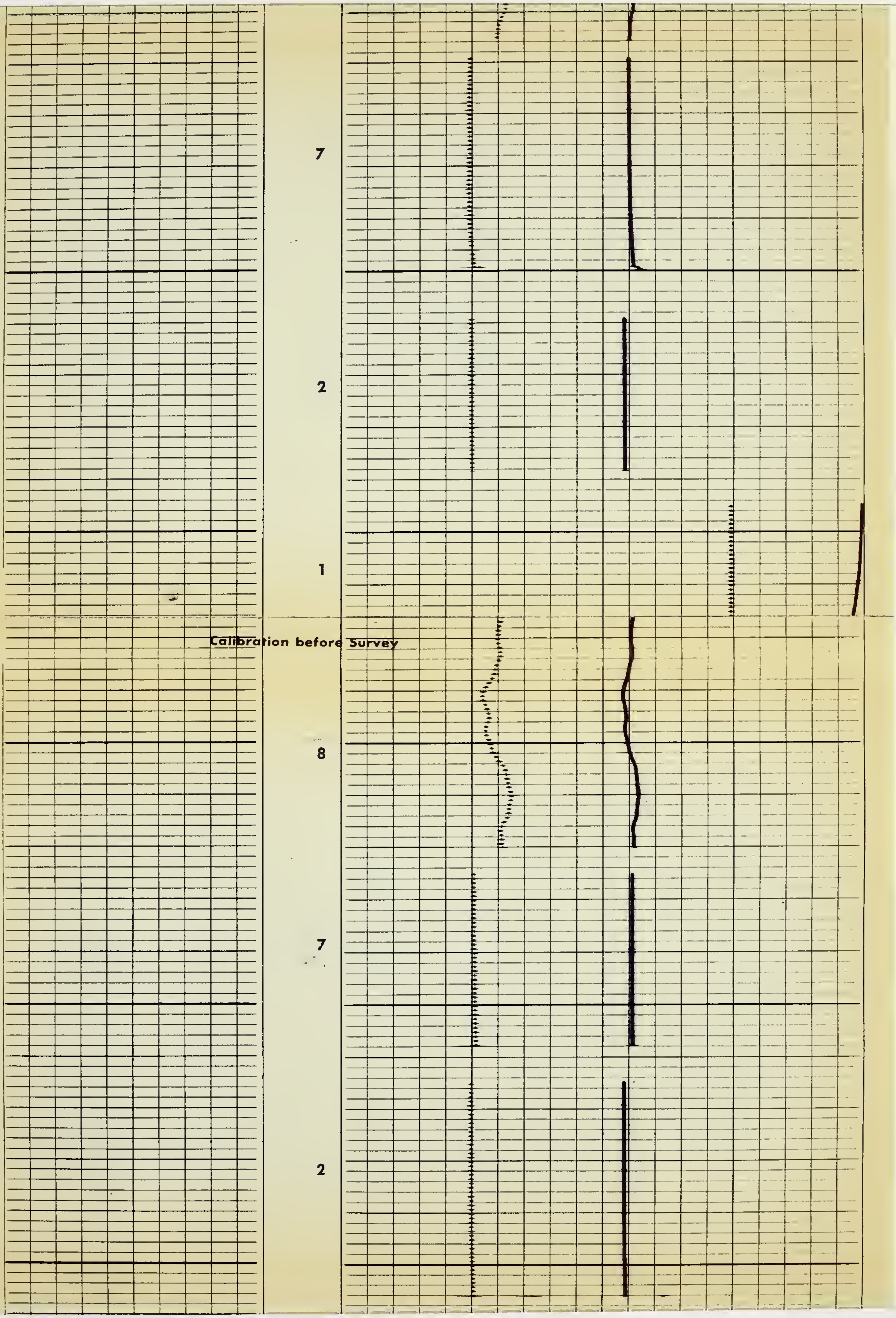
FIELD --

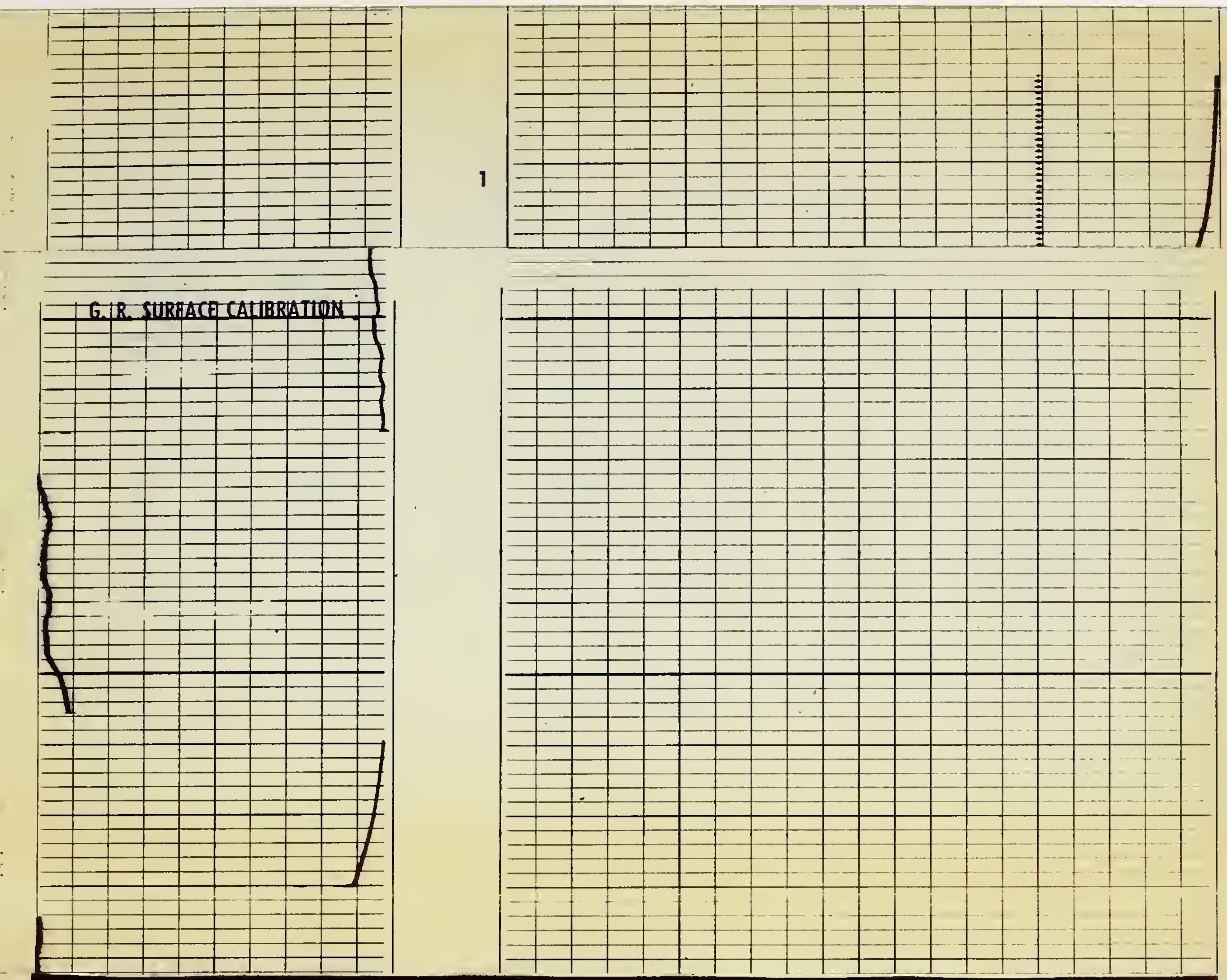
COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 1631
SCHL. TD 1632
DRLR TD 1640
Elev:
KB 6903
DF 6903
GL 6903

CALIBRATION RECORD




7
2
1
Calibration before Survey
8
7
2



COMPENSATED NEUTRON CALIBRATION CODING

1. MECHANICAL ZERO
2. RECORDED SENSITIVITY (THRU MEMORIZER IF USED)

PANEL TEST

	RATIO	OH POROSITY			CH POROSITY	
		LS ☒	SS ☐	DOL ☐	SS ☐	LS ☐
3.	1	1.6	4.9	−0.2	2.4	0.1
4.	2	15.6	19.7	8.1	13.0	9.0
5.	3	31.3	36.0	25.2	29.1	24.1
6.	4	52.2	61.4	53.0	52.2	45.2

7. POROSITY NORMALIZED WITH CNB-A IN PLACE
   7A. TOOL IN NCT-B
8. LOG POSITION WITH CNB-A IN PLACE
   8A. LOG POSITION WITH TOOL IN NCT-B

OH			CH	
LS	SS	DOL	SS	LS
18	22.2	10.4	15.3	11.2

RATIO (NORMALIZED) $= \frac{2.17}{\text{RATIO (NCT-B)}}$ RATIO LOG

FORMATION DENSITY COMPENSATED CALIBRATION CODING

1. MECHANICAL ZERO
2. RECORDER SENSITIVITY

PANEL TEST

FDC LIQUID

	POS	ρ	$\Delta\rho$
3.	# 1	2.92	.00
4.	# 2	2.78	+.14
5.	# 3	2.42	−.10
6.	# 4	2.35	.00
7.	# 5	2.08	.01

8. MECHANICAL ZERO CALIPER
9. 8″ RING
10. 12″ RING
11. TOOL CALIBRATE #1 SET $\rho = 2.50$
12. TOOL CALIBRATE #2 SET $\Delta\rho = .00$
13. LOG POSITION $\rho = 2.59$, $\Delta\rho = .015$

CALIBRATION RECORD

COMPANY ATLANTIC RICHFIELD
WELL SORGHUM GULCH 1-D
FIELD --
COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 1631
SCHL. TD 1632
DRLR TD 1640
Elev:
KB 6903
DF 6903
GL 6903

SWS–1874-B

ENGINEERED PRODUCTION LOGGING

Schlumberger

COMPANY ATLANTIC RICHFIELD

WELL SORGHUM GULCH AQUIFER TEST 1-D
FIELD
COUNTY RIO BLANCO STATE COLORADO

LOCATION: API Serial No.
1515' W LINE 1511 S LINE
Sec. 7 Twp. 3S Rge. 96W

SERVICES RUN:
DIL, BHC, FDC, CNL, GR

Permanent Datum: GL
Elev.: 6903
Log Measured From: GL
Drilling Measured From: GL

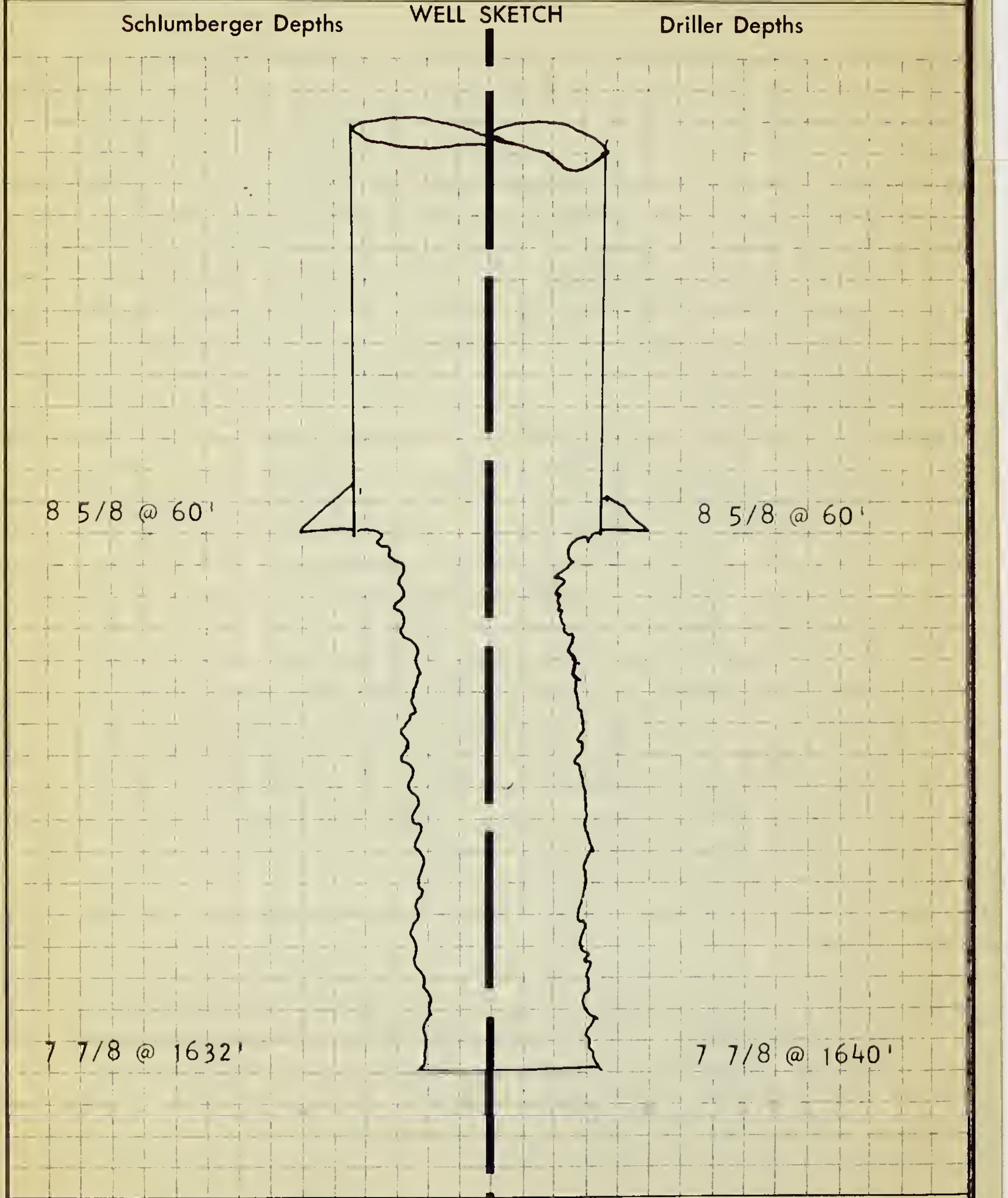
ELEVATION:
KB
DF
GL 6903

Equipment Location: VERNAL 7674
Recorded by: STRAWN
Witnessed by: MR. TAIT

The well name, location and borehole reference data were furnished by the customer.

FOLD HERE

Log depths of these records relate to: ☒ Schlumberger line measurements, ☐ correlated by CCL to Radioactivity Log Measurements.



Indicate: Hole deviation in production zone
Open hole diameter
Diameter and weight of casing and tubing
Position & nature of perforations (bullets, conventional SC, capsules, etc.)

SWS-1427-D

Schlumberger

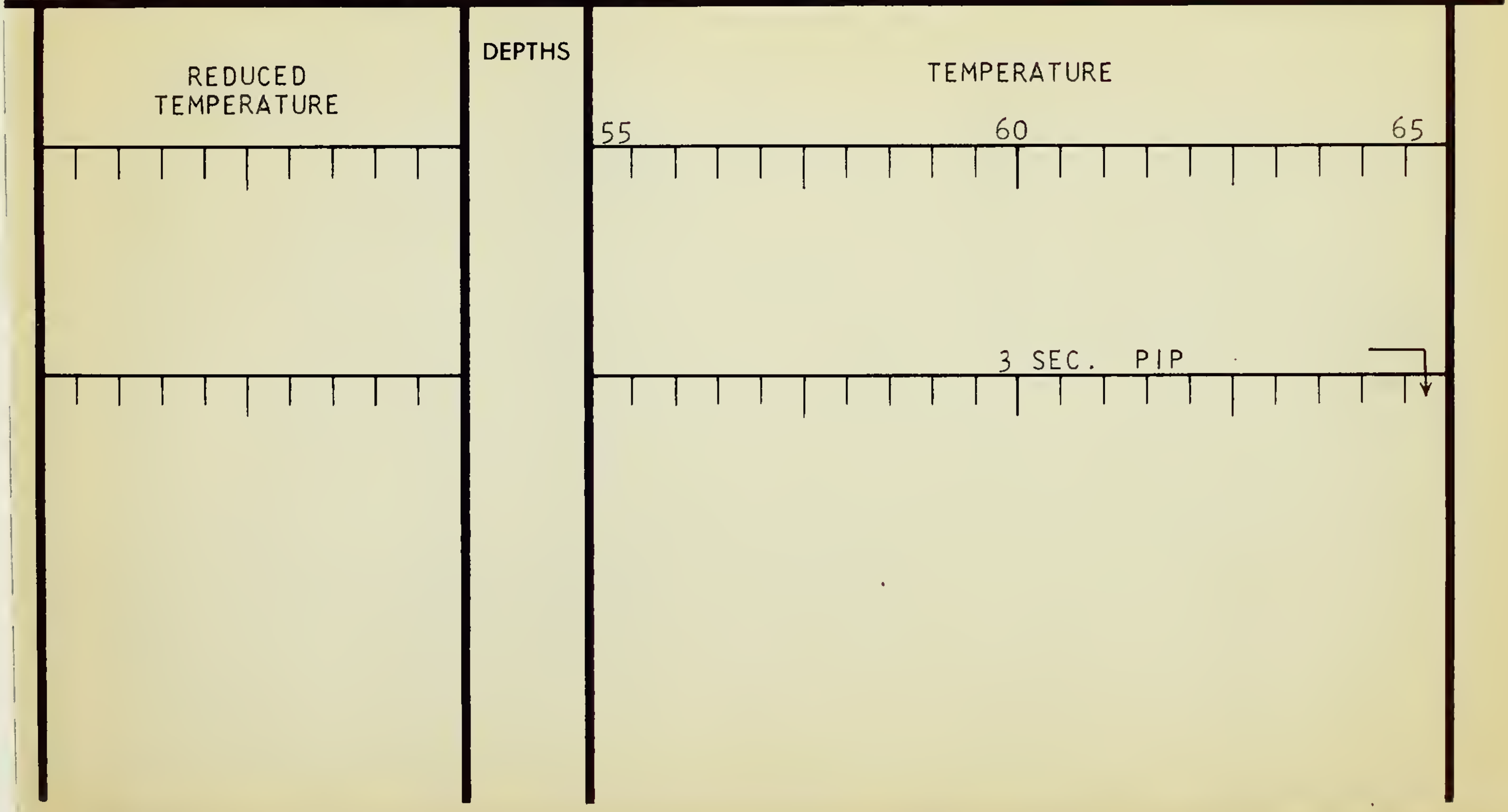
TEMPERATURE

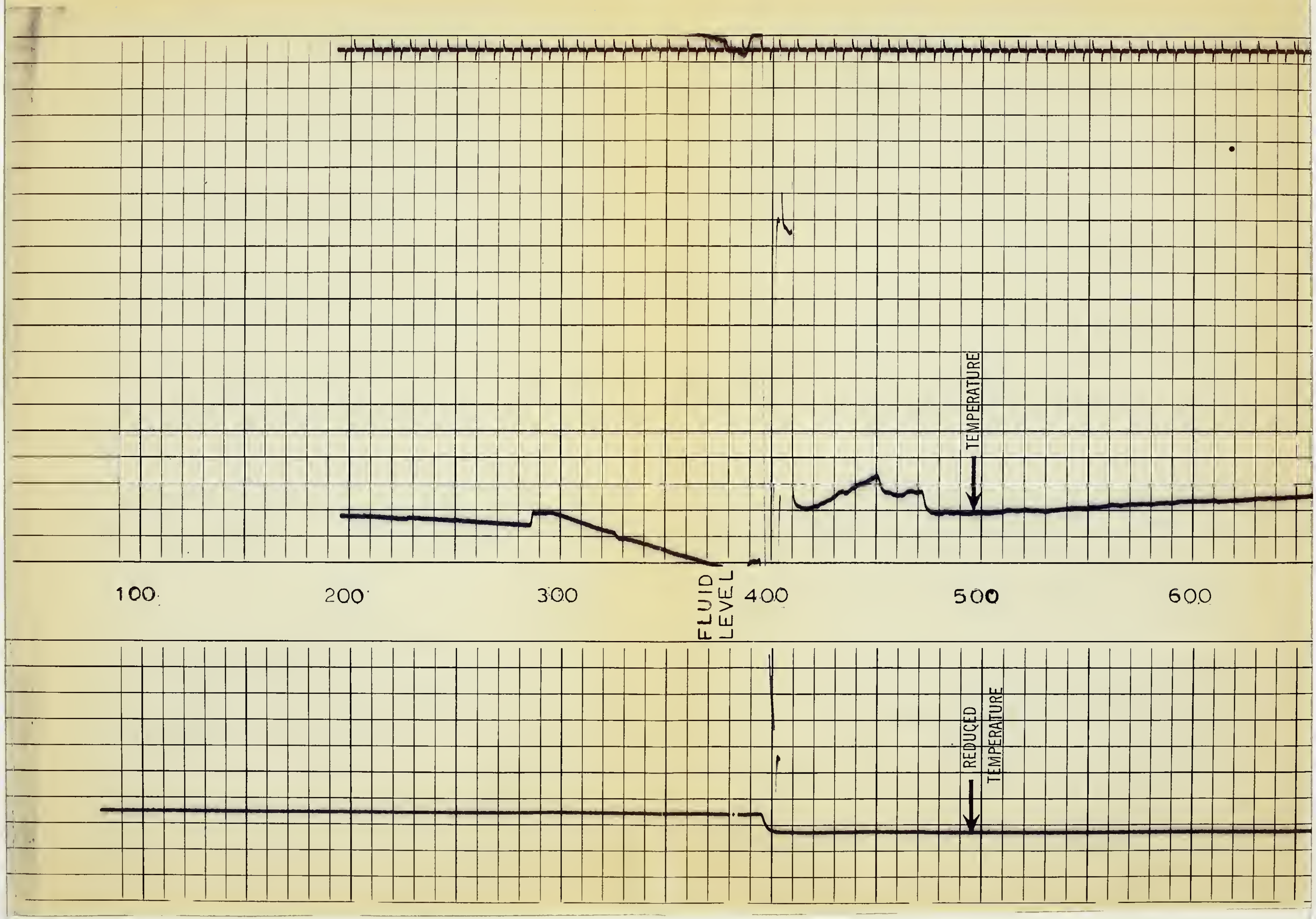
	RUN # 1 PASS # 1	RUN # PASS #	RUN # PASS #	RUN # PASS #	RUN # PASS #
Date	7/28/74				
Production Method	STATIC				
Stabil. time before log					
Hours log began					
Bottom logged interval					
Top logged interval					
Film logged "UP" or "DOWN"					
THP Static psi					
THP Dynamic psi					
BHP Static psi					
BHP Dynamic psi					
Well head temp. °F					
Surf. Prod. Rate					
Surf. Injection Rate					

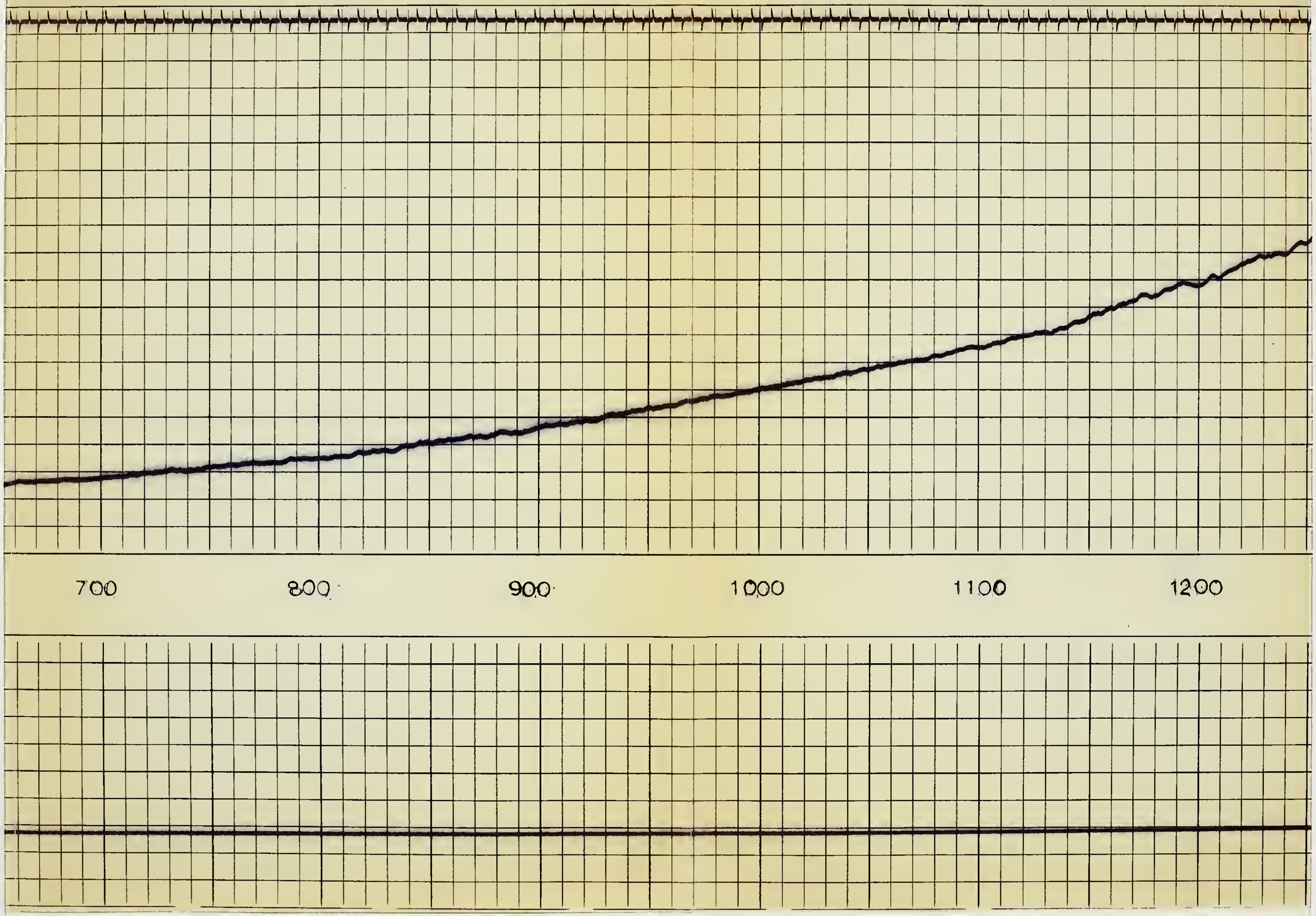
SURFACE EQUIPMENT		DOWNHOLE EQUIPMENT		
PPU 762	TEP	CEC	FAC	CCL
PRU	GNP	CCE	FAA	GNT-K
PCU	ETU	MTS	HUM	SGT-G
HTU	CFP	GMS	SSA	ETC
GMU		TCS	PSA	ETS
CFU		FBS	MSA	PAC-A
CMU		CFS	TEE	HTS-B
FAU		PRC	TEC	TTC

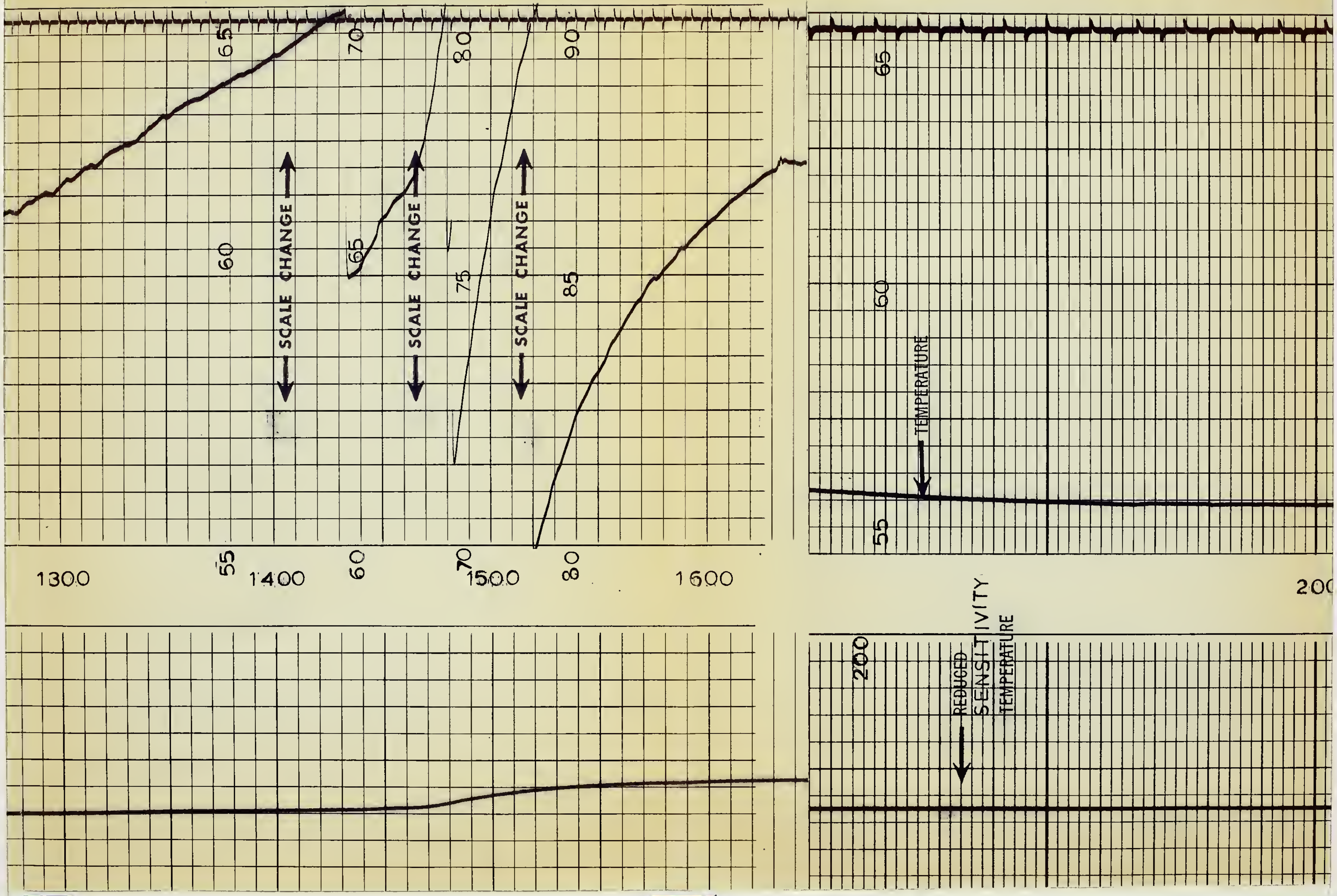
FLOWMETER	CFS	SSA FAA	FBS
Spinner Size			
Spinner Pitch			

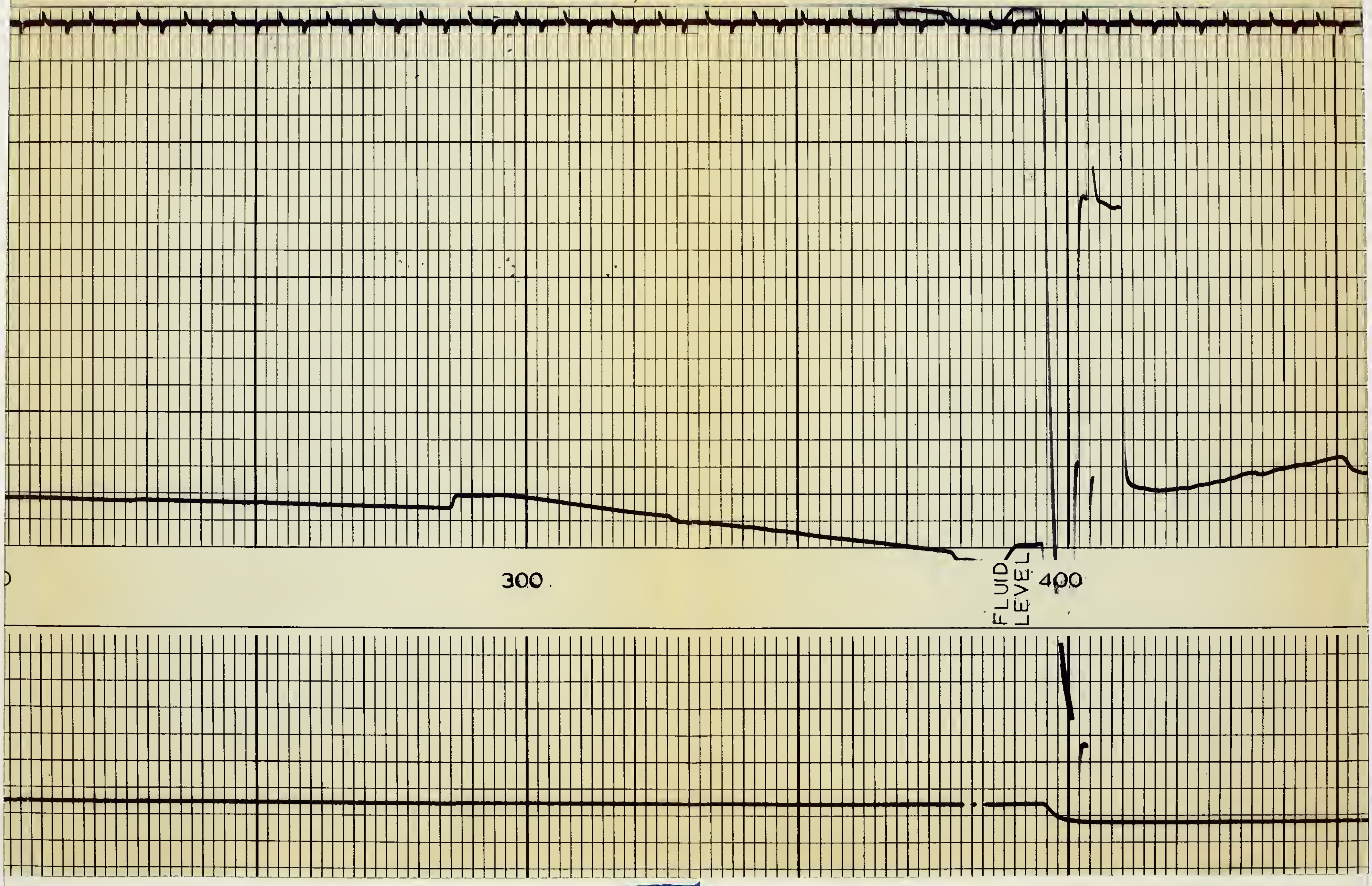
REMARKS

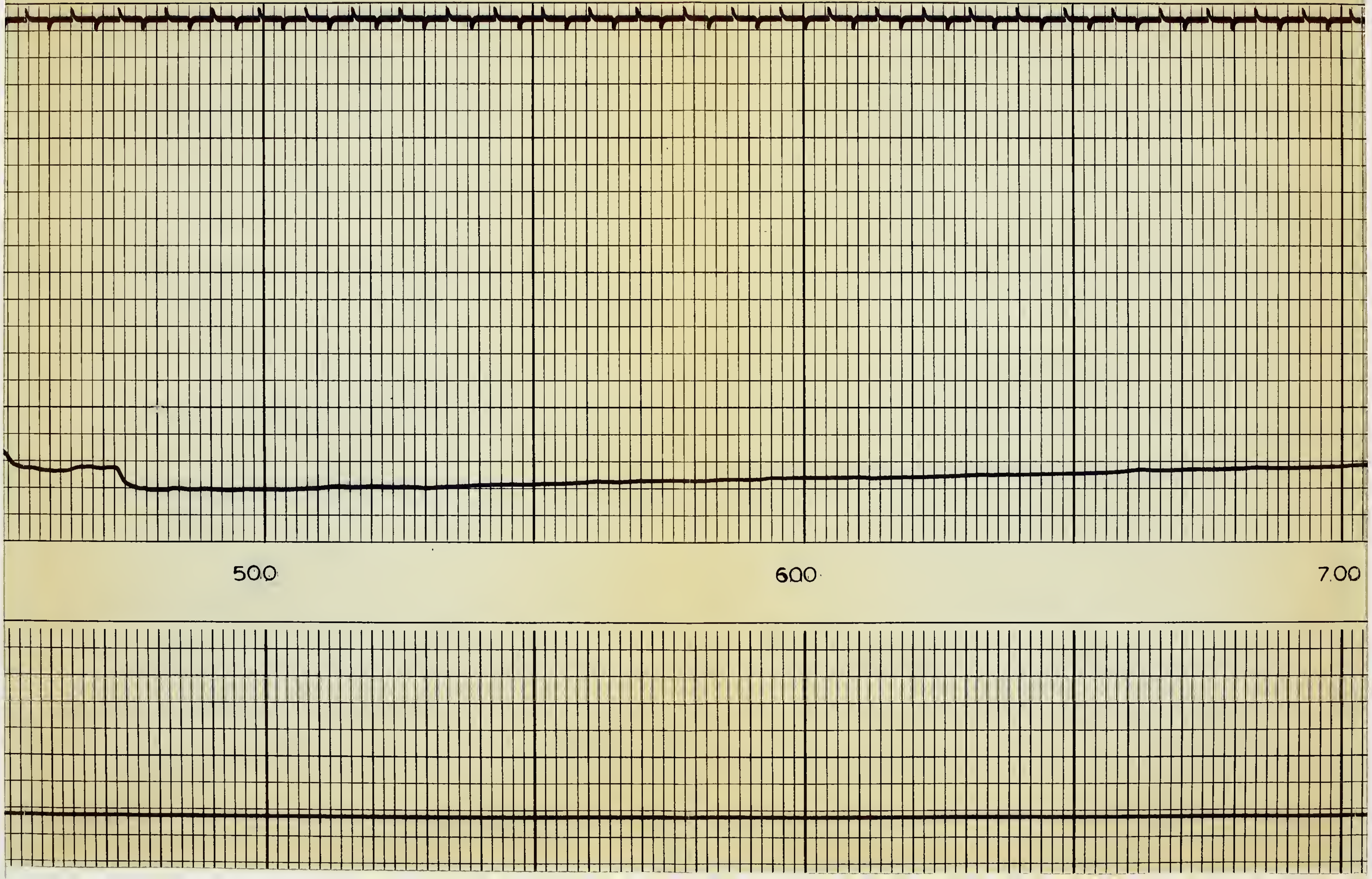



100
200
300
FLUID LEVEL
400
500
600
TEMPERATURE
REDUCED TEMPERATURE

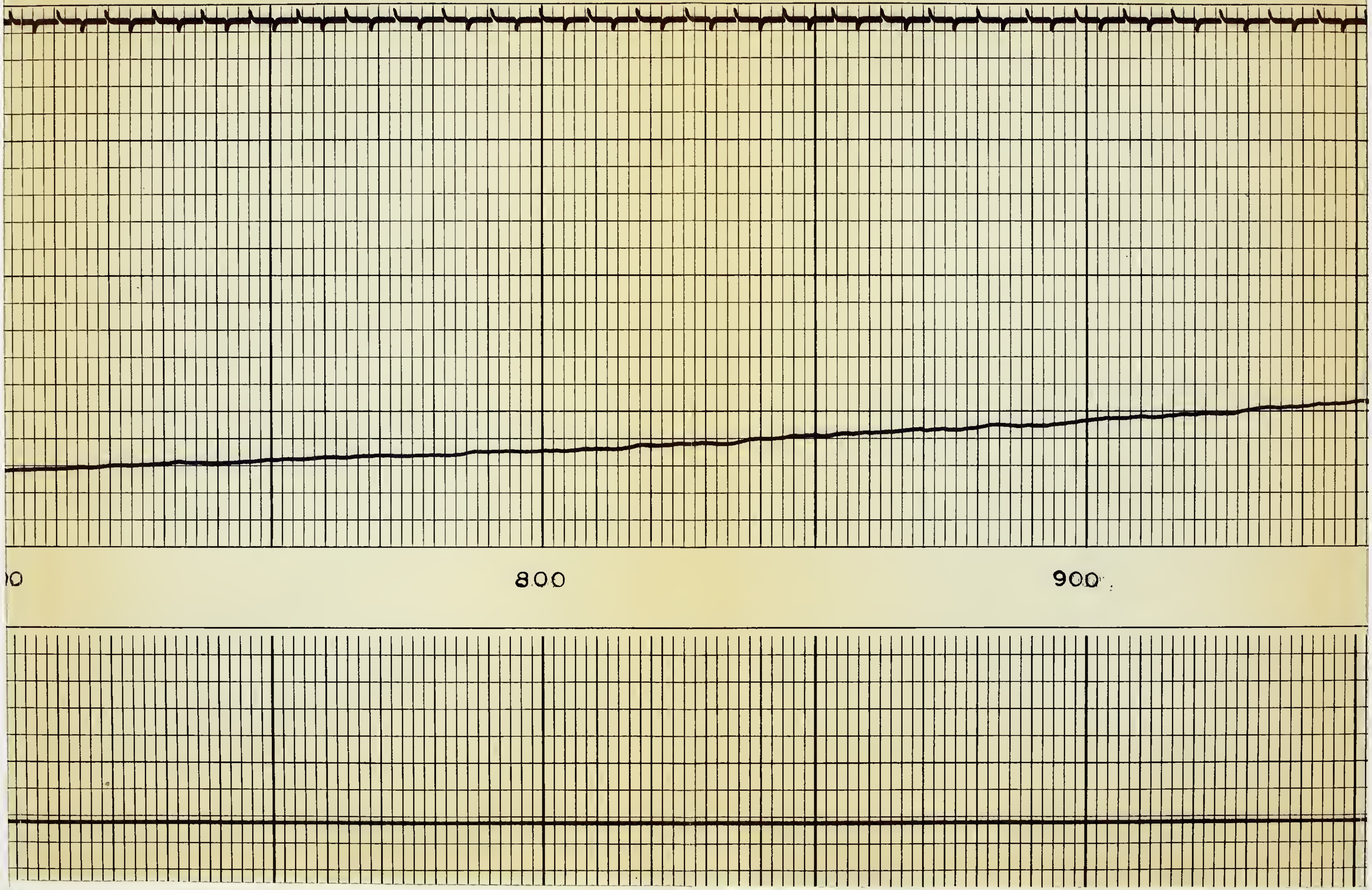

700
800
900
1000
1100
1200

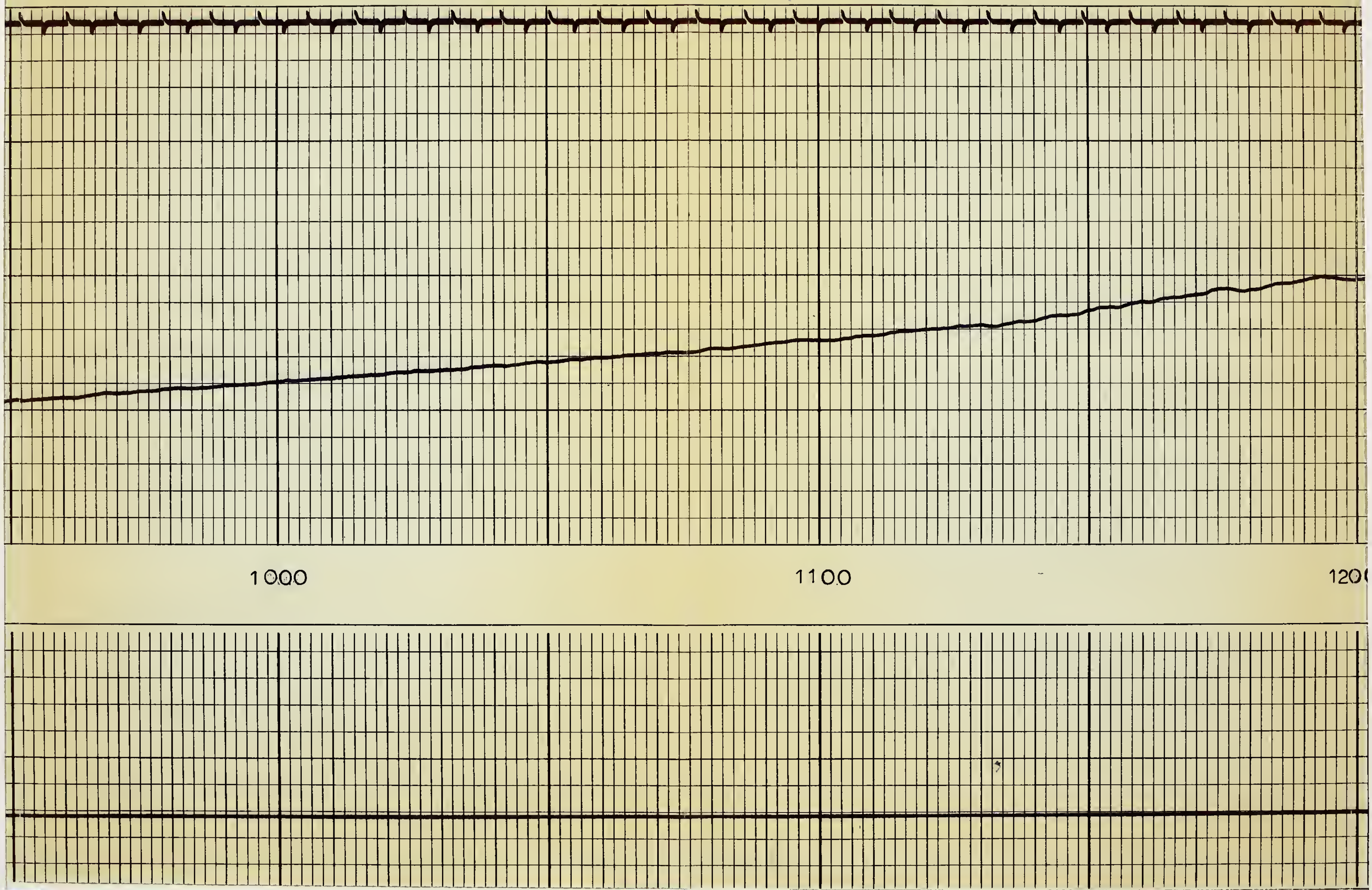

65
70
80
90
60
65
75
85
SCALE CHANGE
SCALE CHANGE
SCALE CHANGE
55
60
70
80
1300
1400
1500
1600
65
60
55
TEMPERATURE
200
REDUCED
SENSITIVITY
TEMPERATURE
200


300
FLUID LEVEL
400

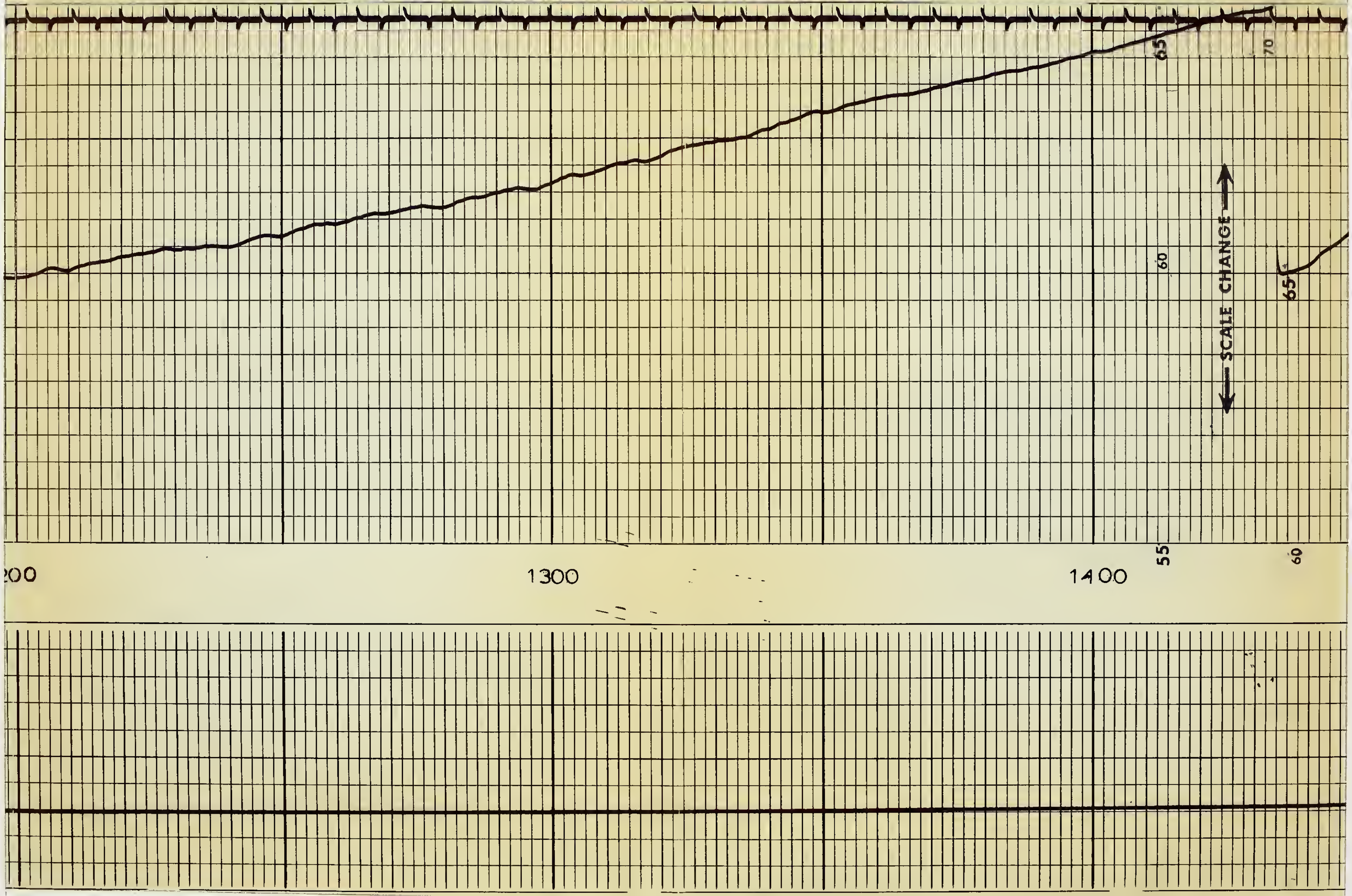


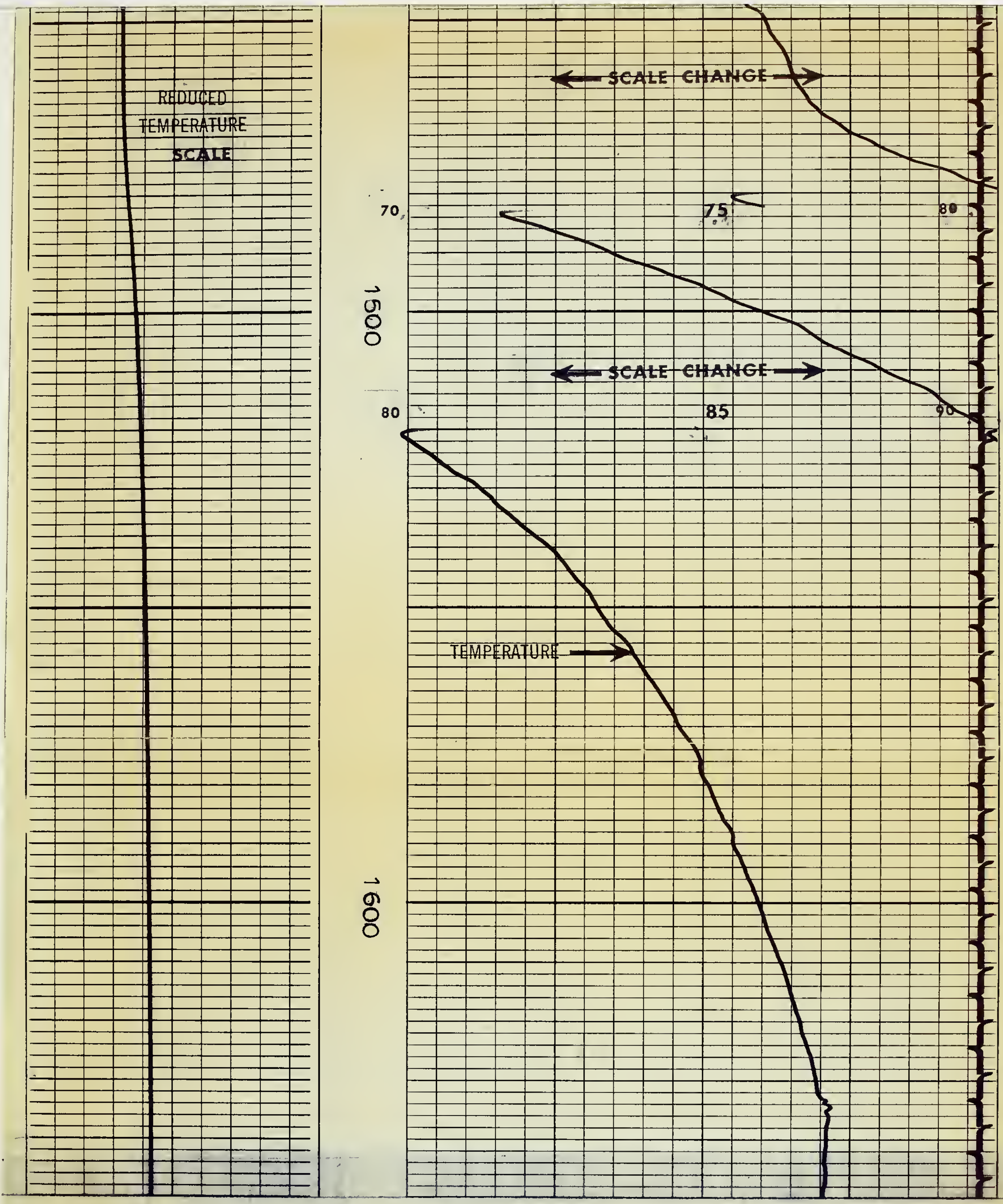
5:00
6:00
7:00


00
800
900



1000
1100
120


65
70
60
SCALE CHANGE
65
55
60
200
1300
1400



COMPANY ATLANTIC RICHFIELD
WELL SORGHUM GULCH AQUIFER TEST 1-D
FIELD

Schlumberger

PRODUCTION LOGGING SERVICES

ENGINEERED PRODUCTION LOGGING

Schlumberger

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGUN GULCH NO. 10

FIELD ----

COUNTY RIO BLANCO STATE COLORADO

LOCATION: 97'FNL, 184'FEL

Sec. 13 Twp. 3S Rge. 92W

SERVICES RUN:

Permanent Datum: GL Elev.: ----

Log Measured From: GL

Drilling Measured From: GL

ELEVATION:

KB ----
DF ----
GL ----

Equipment Location: 5602-GRAND JUNCTION

Recorded by: SCHNORR 7-21-74

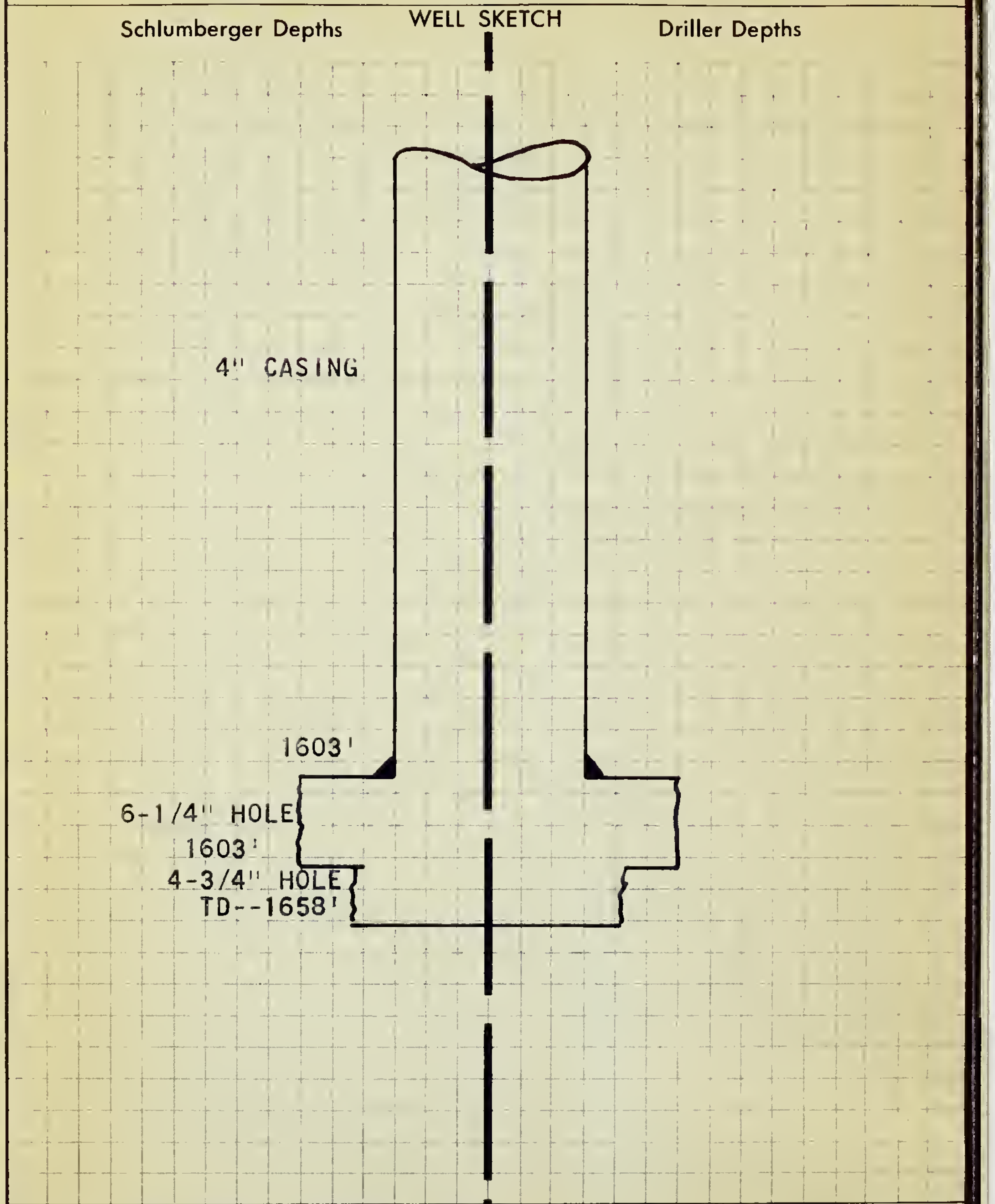
Witnessed by: BARRET

SWS-1424-C

The well name, location and borehole reference data were furnished by the customer.

FOLD HERE

Log depths of these records relate to: ☐ Schlumberger line measurements,
☐ correlated by CCL to Radioactivity Log Measurements.


Schlumberger Depths
WELL SKETCH
Driller Depths
4" CASING
1603'
6-1/4" HOLE
1603'
4-3/4" HOLE
TD--1658'

Indicate:
- Hole deviation in production zone
- Open hole diameter
- Diameter and weight of casing and tubing
- Position & nature of perforations (bullets, conventional SC, capsules, etc.)

Schlumberger

TEMPERATURE

	RUN # 1 PASS #	RUN # 2 PASS #	RUN # PASS #	RUN # PASS #	RUN # PASS #
Date	7-21-74	7-21-74			
Production Method	STATIC	----			
Stabil. time before log					
Hours log began	23:30	00:30			
Bottom logged interval	1662	1662			
Top logged interval	250	1480			
Film logged "UP" or "DOWN"	DOWN	UP			
THP Static psi					
THP Dynamic psi					
BHP Static psi					
BHP Dynamic psi					
Well head temp. °F					
Surf. Prod. Rate					
Surf. Injection Rate					

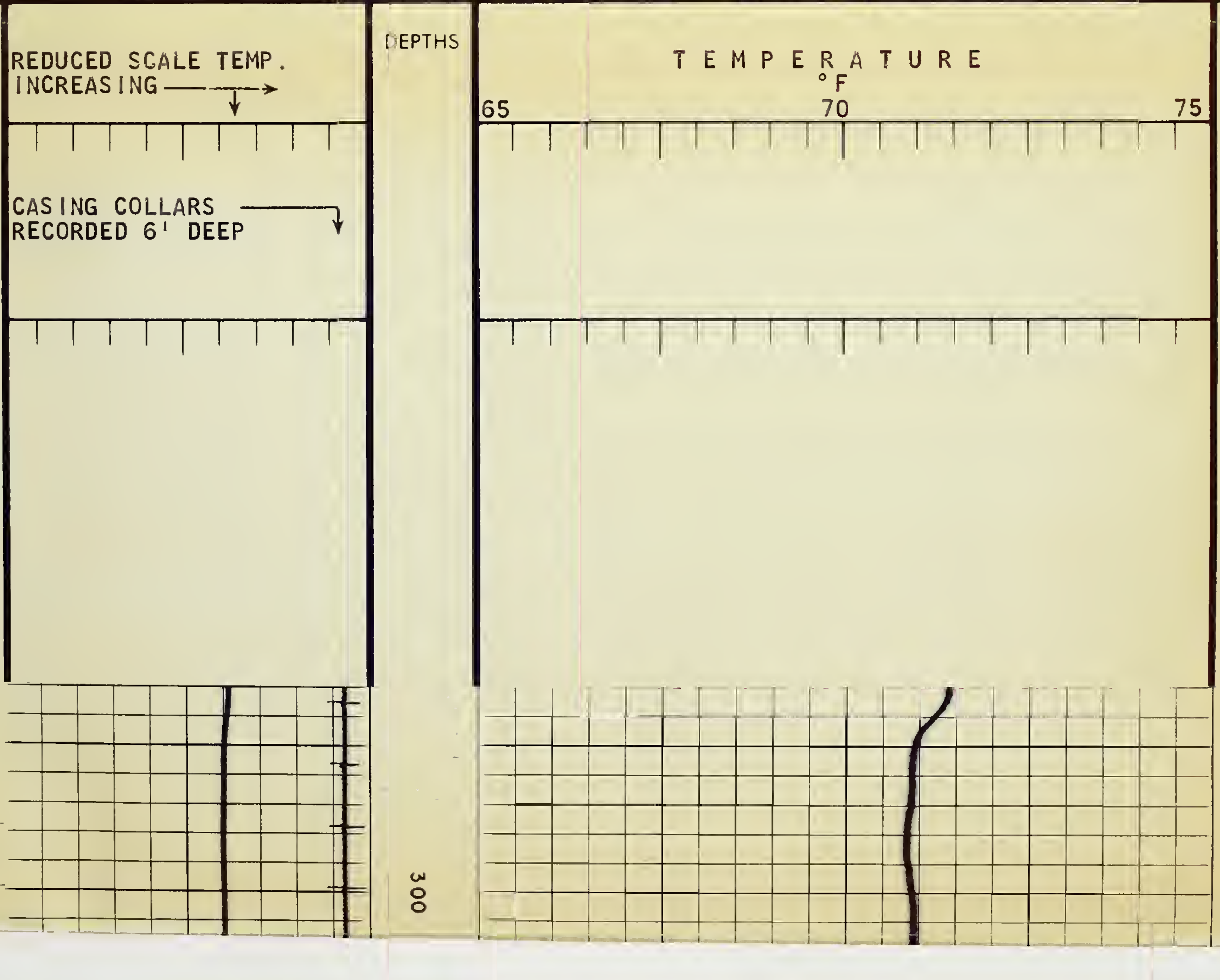
SURFACE EQUIPMENT	
PPU	TEP
PRU	GNP
PCU	ETU
HTU	CFP
GMU	
CFU	
CMU	
FAU	

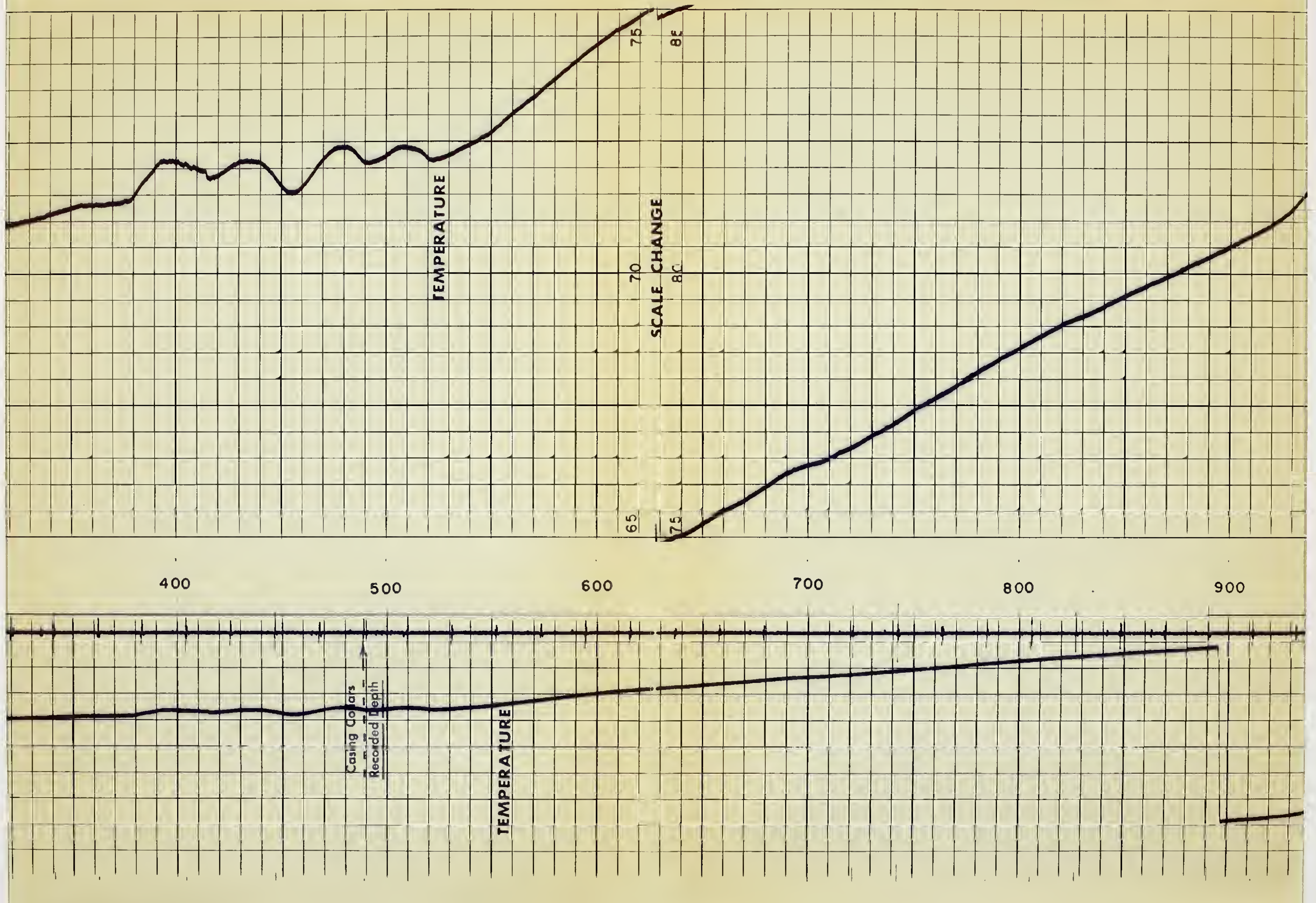
DOWNHOLE EQUIPMENT		
CEC	FAC	CCL
CCE	FAA	GNT-K
MTS	HUM	SGT-G
GMS	SSA	ETC
TCS	PSA	ETS
FBS	MSA	PAC-A
CFS	TEE	HTS-B
PRC	TEC	TTC

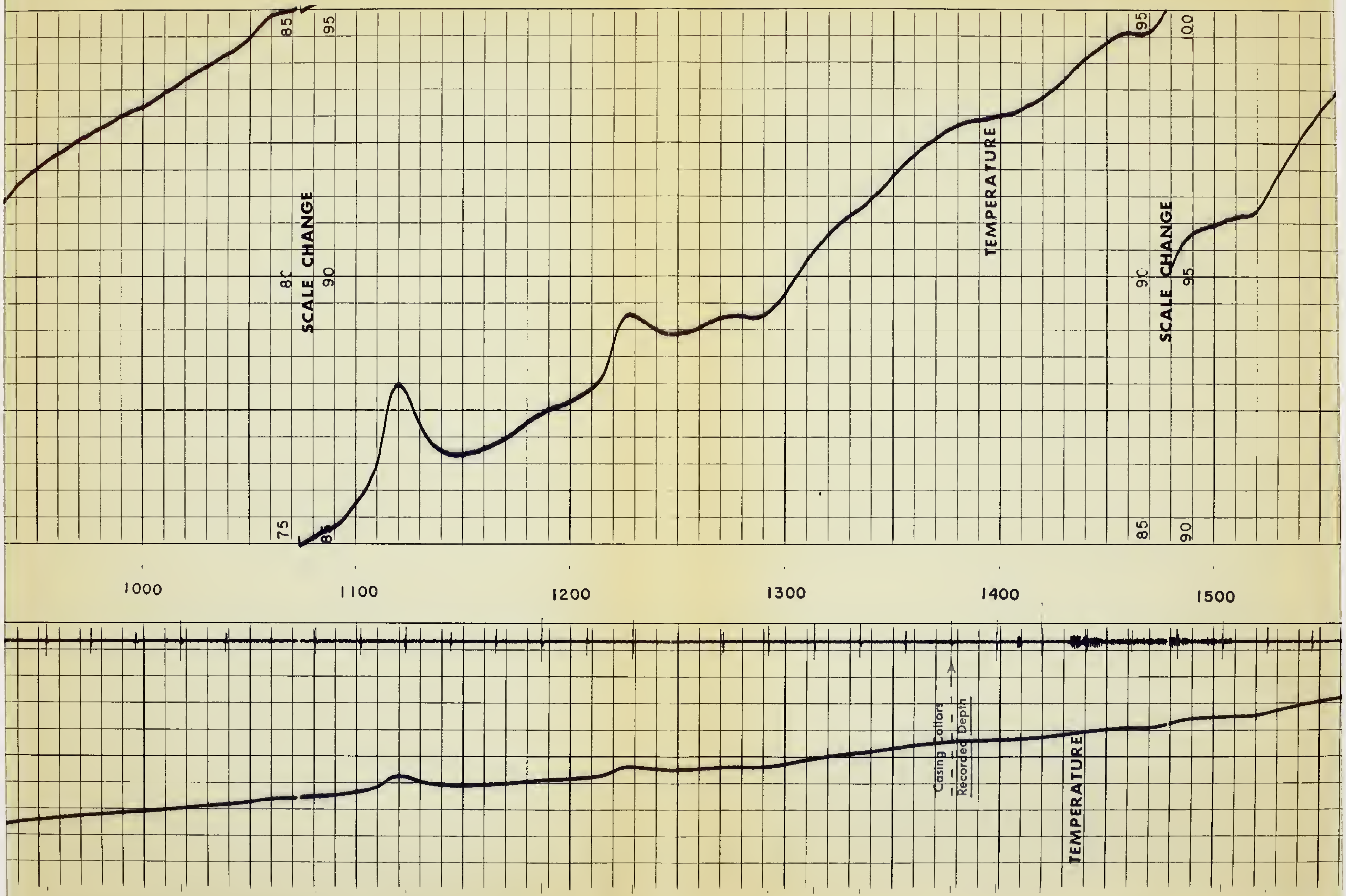
FLOWMETER	CFS	SSA FAA	FBS
Spinner Size			
Spinner Pitch			

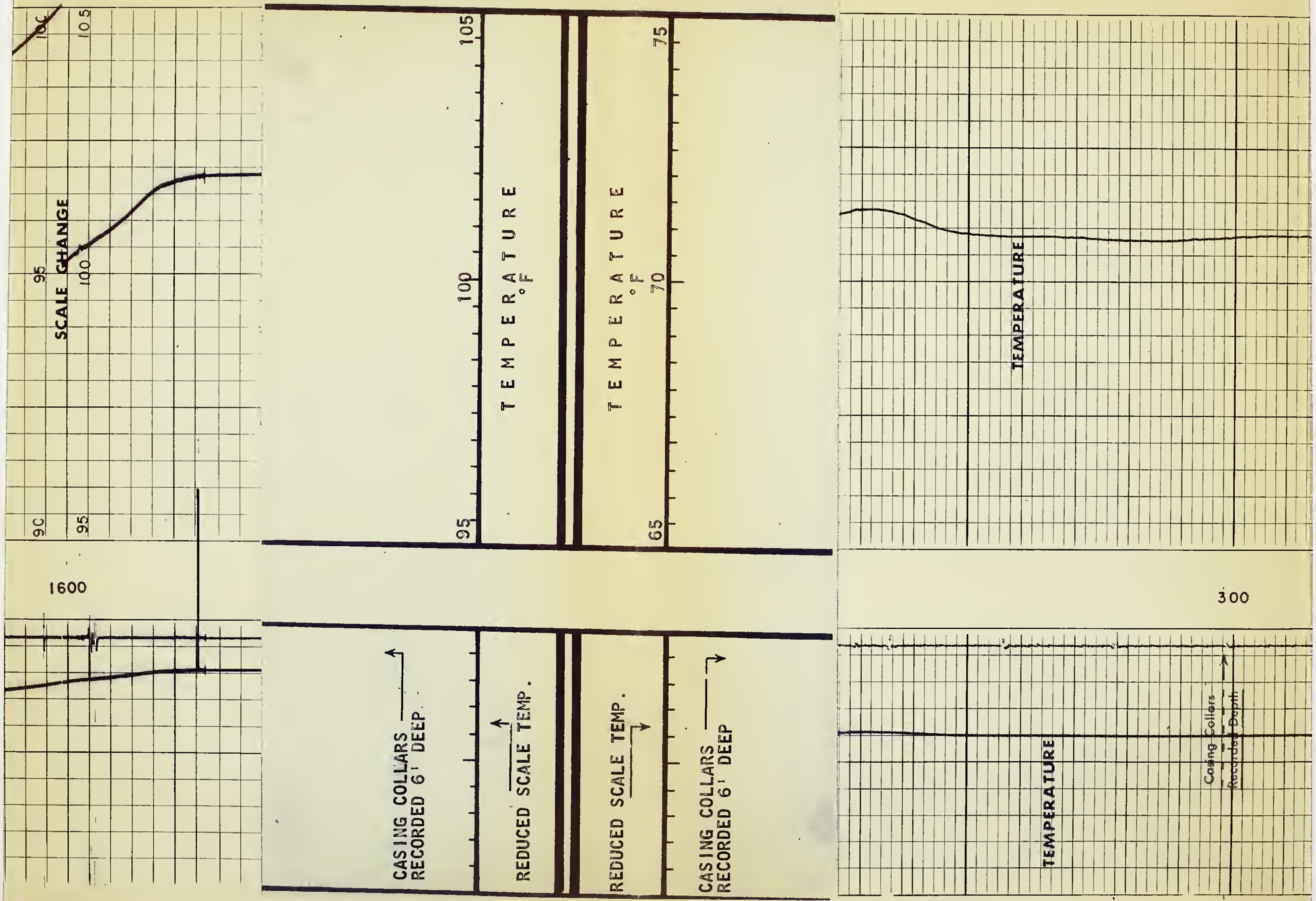
REMARKS

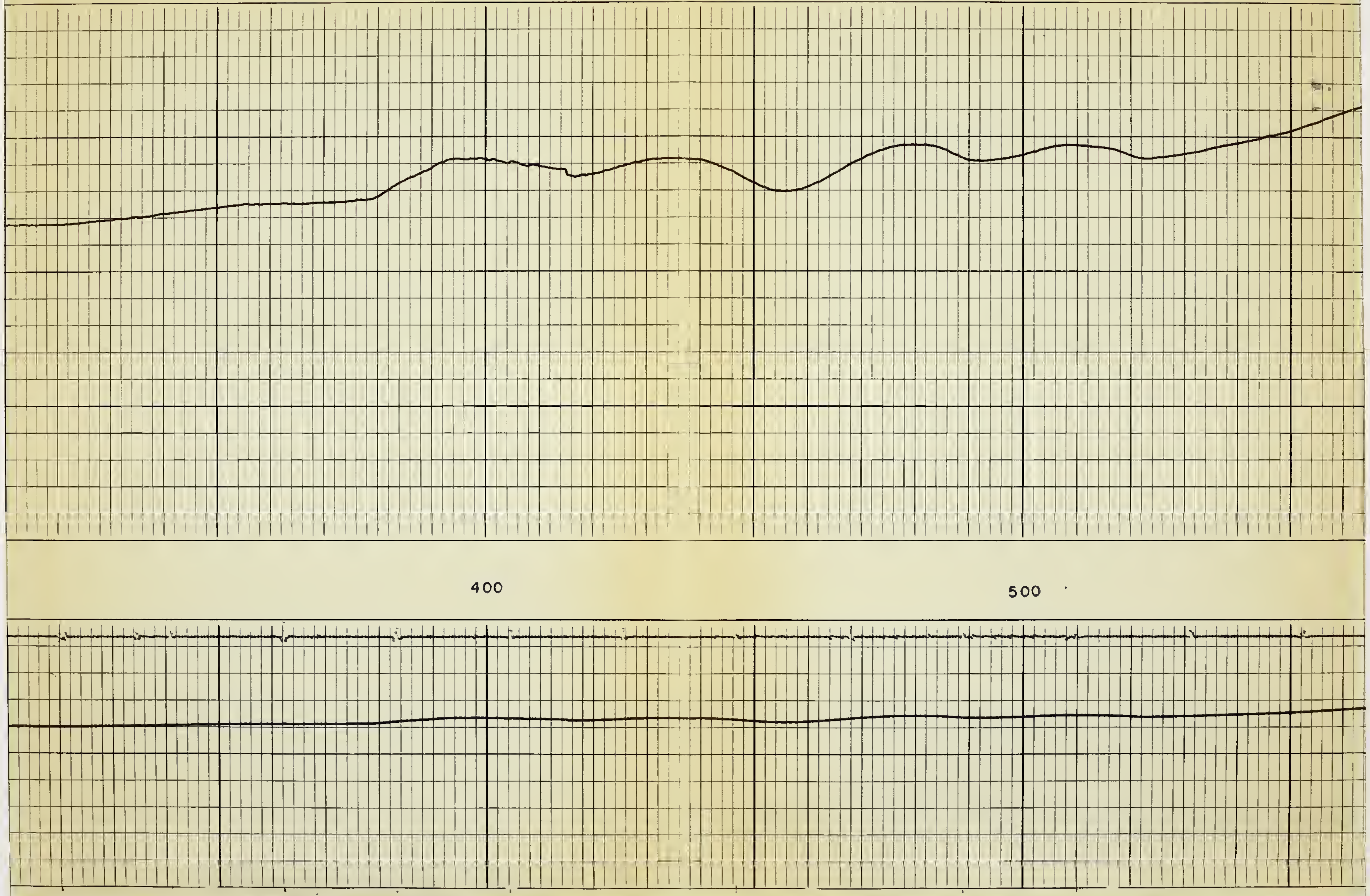
LOG WAS RUN TO DETERMINE IF THERE WAS COMMUNICATION BEHIND CASING.

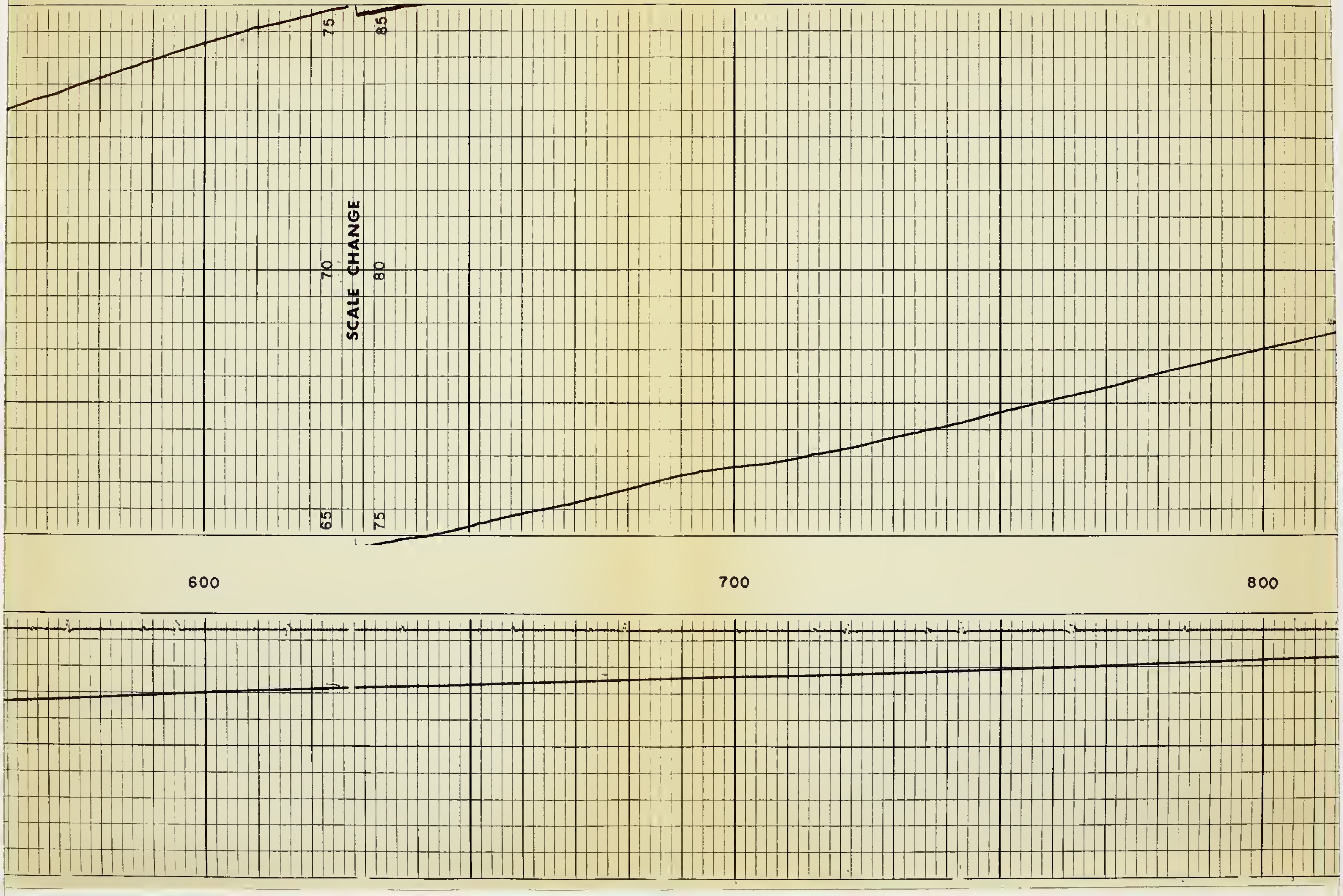


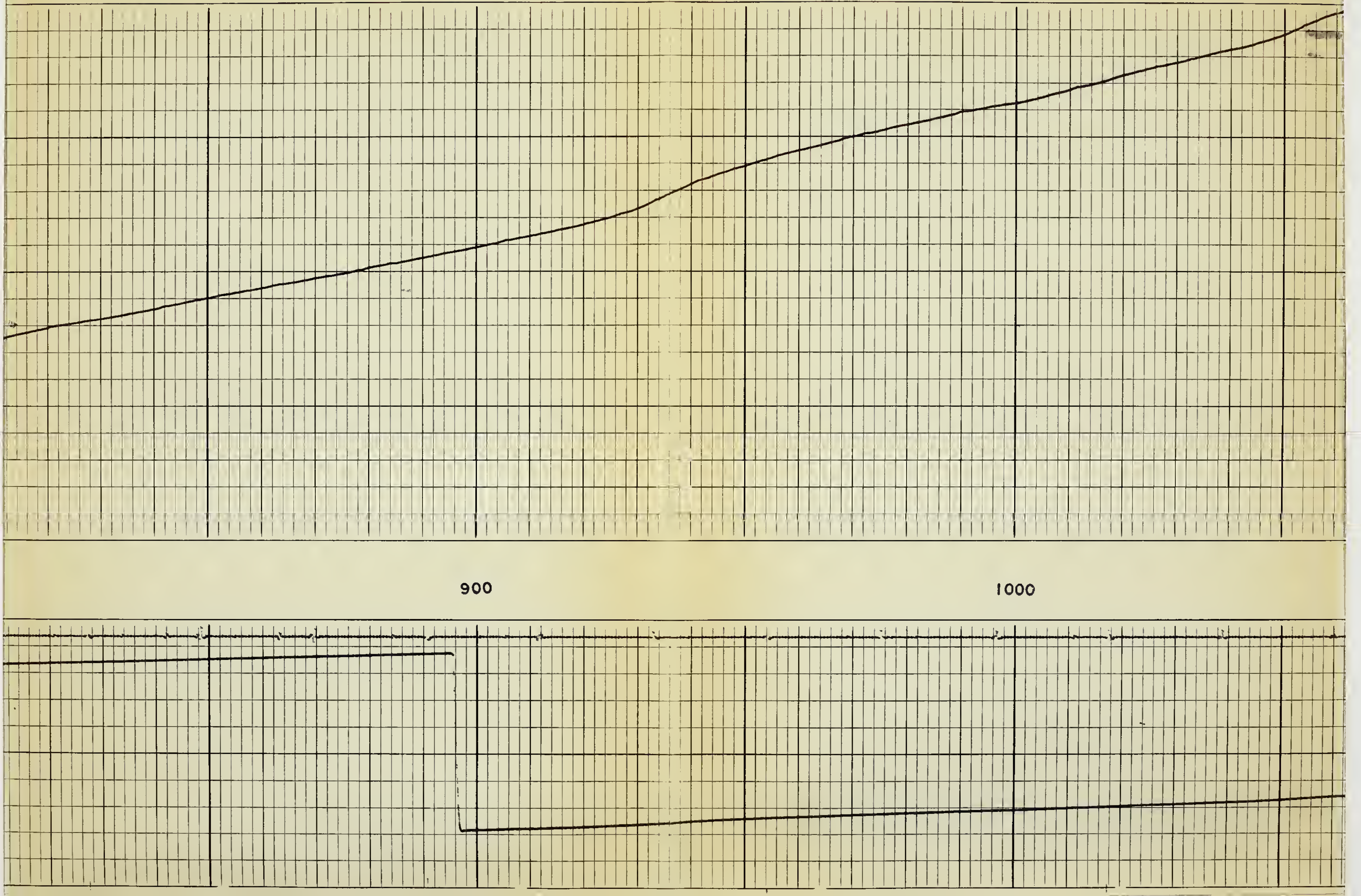

TEMPERATURE
75
70
65
85
80
75
SCALE CHANGE
400
500
600
700
800
900
Casing Collars
Recorded Depth
TEMPERATURE

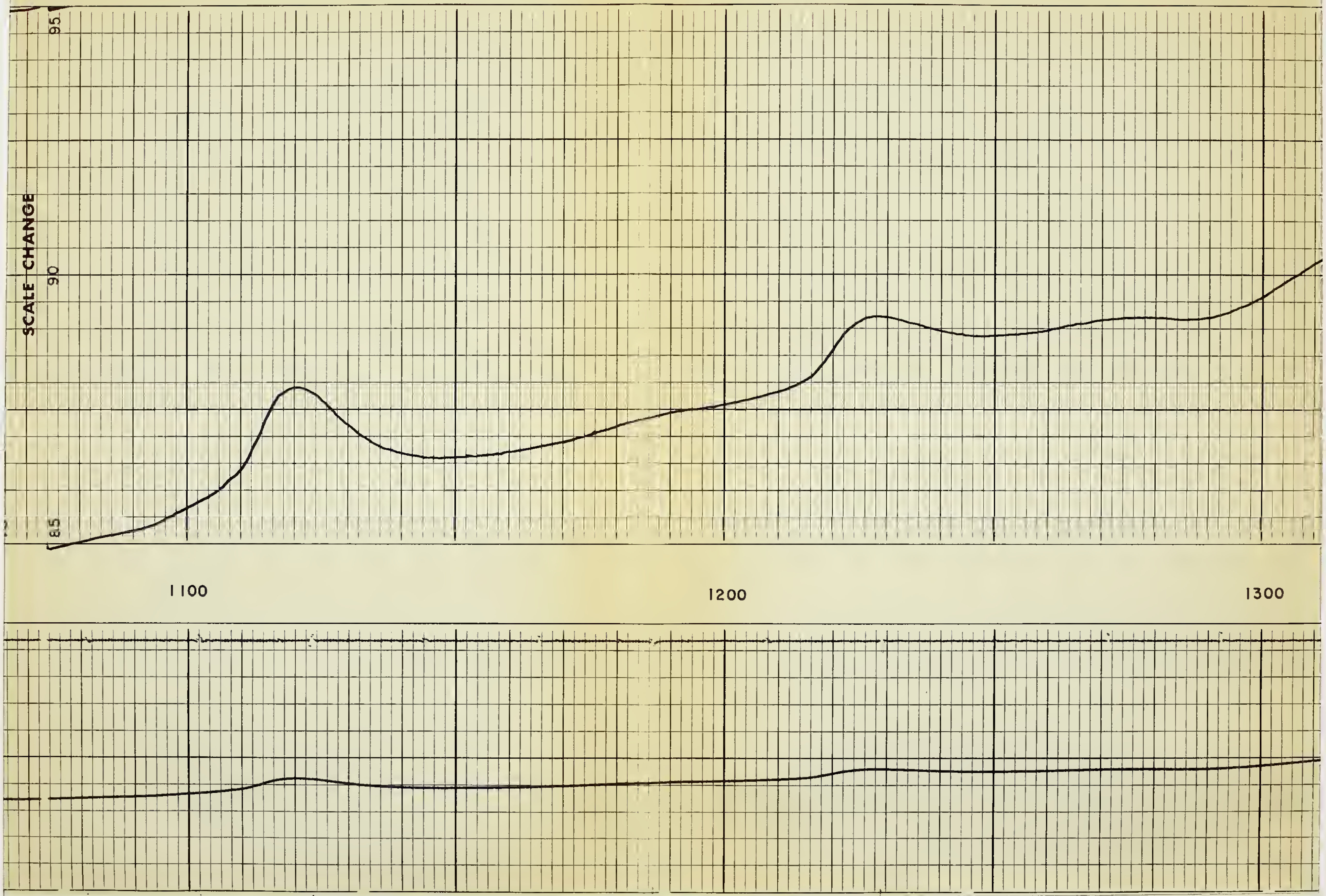

85
95
SCALE CHANGE
80
90
75
85
TEMPERATURE
95
100
90
SCALE CHANGE
95
85
90
1000
1100
1200
1300
1400
1500
Casing Collars
Recorded Depth
TEMPERATURE

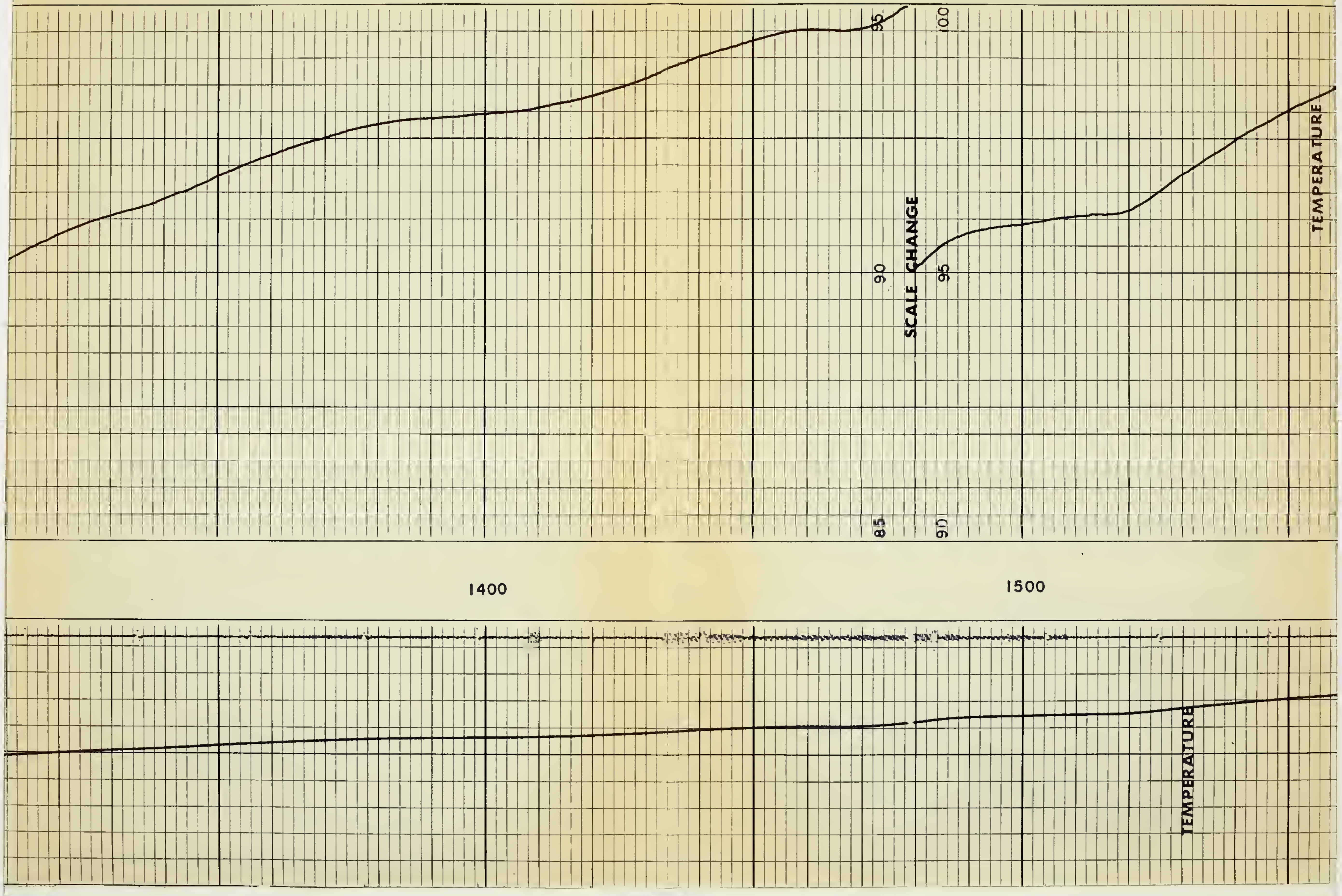

100
105
SCALE CHANGE
95
100
90
95
1600
105
100
95
TEMPERATURE °F
75
70
65
TEMPERATURE °F
TEMPERATURE
300
CASING COLLARS RECORDED 6' DEEP
REDUCED SCALE TEMP.
REDUCED SCALE TEMP.
CASING COLLARS RECORDED 6' DEEP
TEMPERATURE
Casing Collars
Recorded Depth

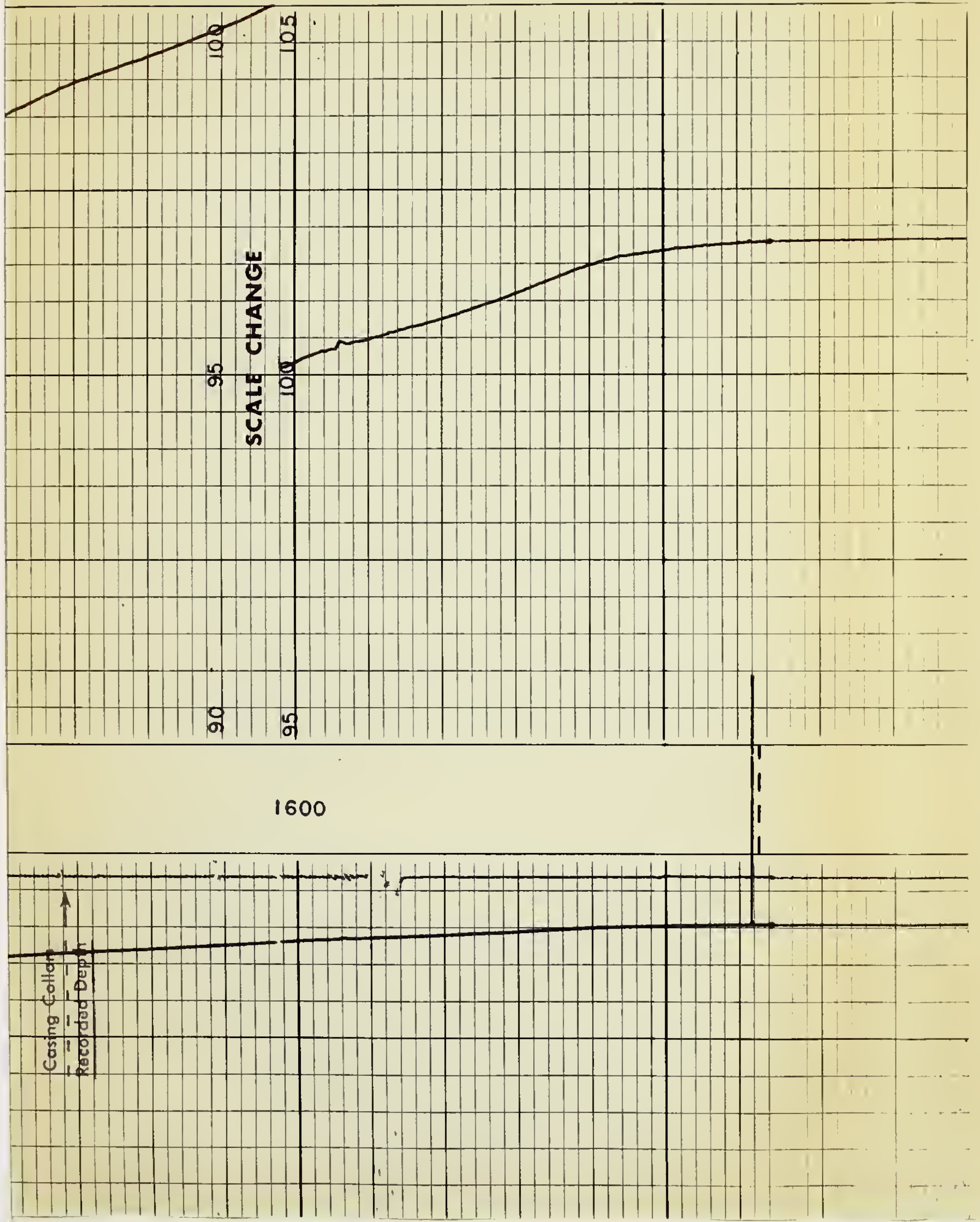

400
500


75
85
70
SCALE CHANGE
80
65
75
600
700
800

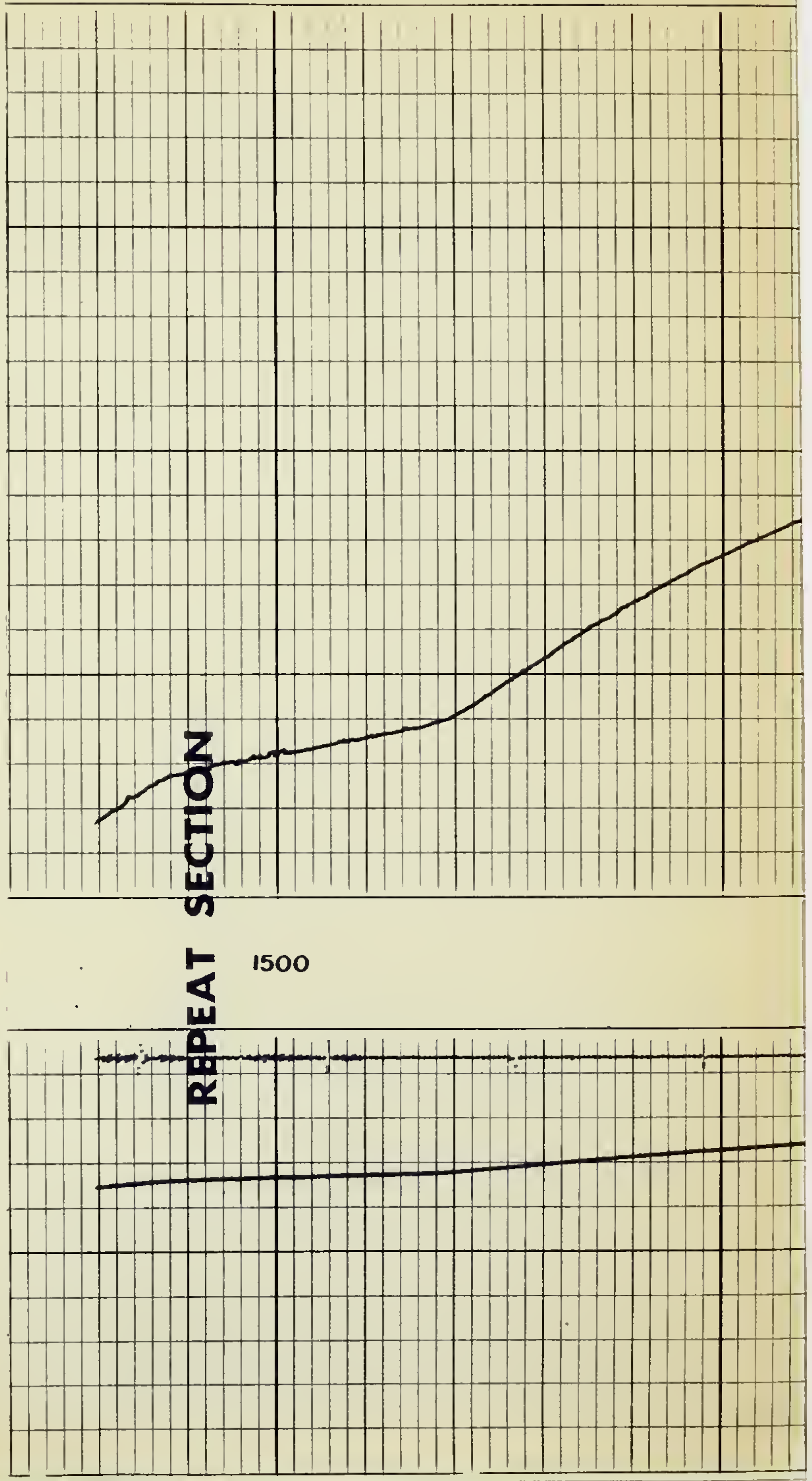

900
1000


95
SCALE CHANGE
90
85
1100
1200
1300

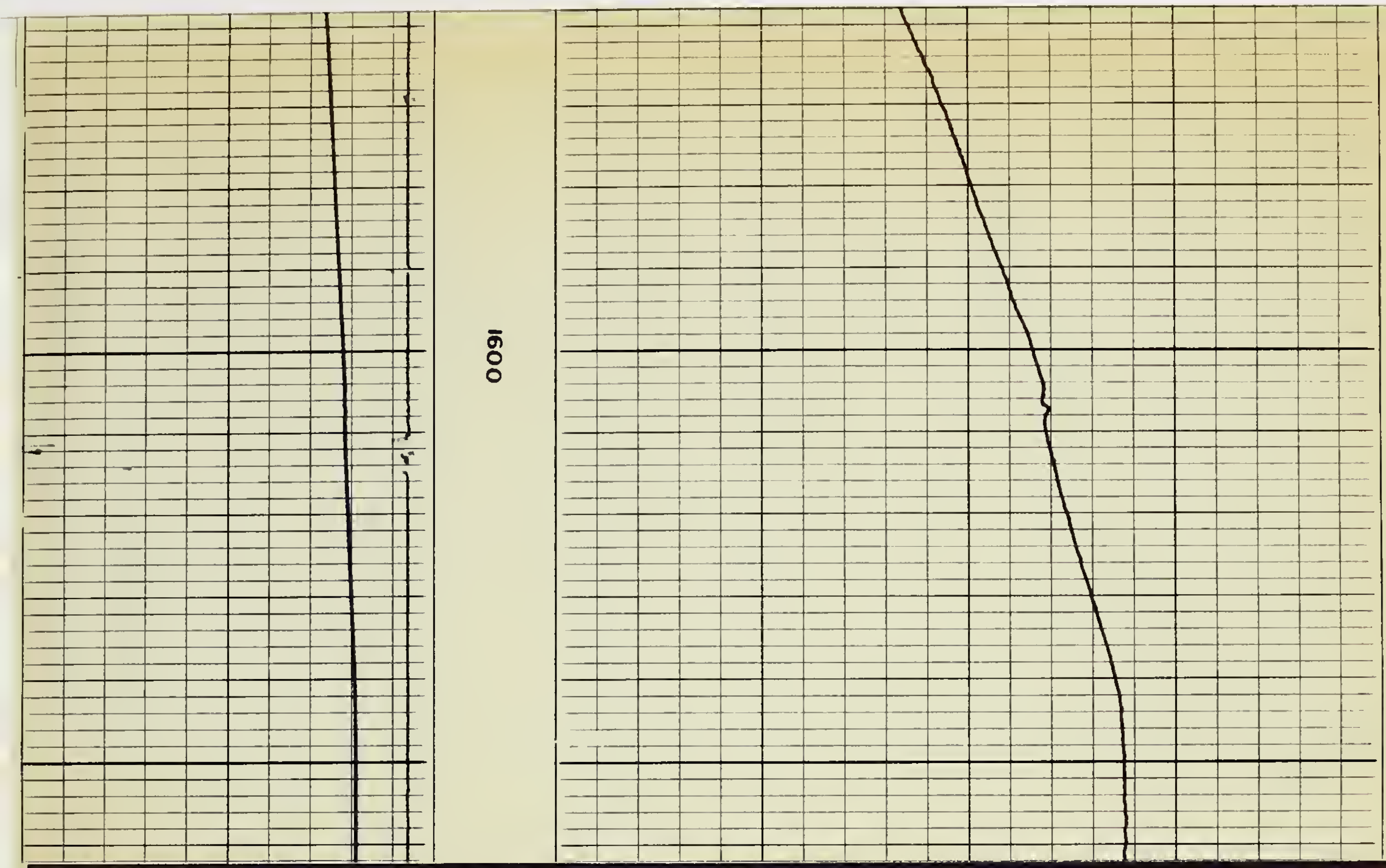

95
100
SCALE CHANGE
90
95
85
90
TEMPERATURE
1400
1500
TEMPERATURE



10.0
10.5
SCALE CHANGE
9.5
10.0
9.0
9.5
1600
Casing Collars
Recorded Depth



REPEAT SECTION
1500



COMPANY THE ATLANTIC RICHFIELD COMPANY

WELL SORGUM GULCH NO. 10

FIELD ----

COUNTY RIO BLANCO STATE COLORADO

Elev:
KB
DF
GL ----

Birdwell

Electric Log

COMPANY ATLANTIC RICHFIELD COMPANY.
ET. AL.
WELL SORGHUM GULCH #H-10
FIELD
COUNTY RIO BLANCO **STATE** COLORADO

LOCATION: 97' FNL & 184' FEL
SEC. 13 TWP. 3S RGE. 97W

OTHER SERVICES: CAL FDL V3D TL GR/ENP

PERMANENT DATUM GROUND LEVEL ELEV. 6950'
LOG MEASURED FROM GL , FT. ABOVE PERM. DATUM
DRILLING MEASURED FROM GL

ELEV. K.B.
D.F.
G.L 6950'

DATE	29 JUNE 74			
RUN NO.	1			
DEPTH—DRILLER	2211			
DEPTH—LOGGER	2206			
BTM. LOG INTER.	2204			
TOP LOG INTER.	450			
CASING—DRILLER	7" @ 62'	@	@	@
CASING—LOGGER	62			
BIT SIZE	5-5/8" 62'-1200' 4-7/8"			
TYPE FLUID IN HOLE	WATER			
DENS. | VISC.				
pH | FLUID LOSS	ml	ml	ml	ml
SOURCE OF SAMPLE	PIT			
Rm @ MEAS. TEMP.	6.0 @ 60 °F	@ °F	@ °F	@ °F
Rmf @ MEAS. TEMP.	@ °F	@ °F	@ °F	@ °F
Rmc @ MEAS. TEMP.	@ °F	@ °F	@ °F	@ °F
SOURCE Rmf | Rmc				
Rm @ B.H.T.	98 °F	@ °F	@ °F	@ °F
TIME SINCE CIRC.	11 HRS.			
MAX. REC. TEMP.	98 °F	°F	°F	°F
EQUIP. | LOCATION	2694 | LAS VEGAS			
RECORDED BY	WILSON			
WITNESSED BY	TAIT			

THIS HEADING AND LOG CONFORM TO API RP-31 ®

SSC-605. C

REMARKS NA-NOT AVAILABLE

CHANGES IN MUD TYPE OR ADDITIONAL SAMPLES

DATE | SAMPLE NO.		
DEPTH—DRILLER		
TYPE FLUID IN HOLE		
DENS. | VISC.		
pH | FLUID LOSS	ml	ml
SOURCE OF SAMPLE		
Rm @ MEAS. TEMP.	@ °F	@ °F
Rmf @ MEAS. TEMP.	@ °F	@ °F
Rmc @ MEAS. TEMP.	@ °F	@ °F
SOURCE Rmf | Rmc		
Rm @ B.H.T.	@ °F	@ °F
Rmf @ B.H.T.	@ °F	@ °F
Rmc @ B.H.T.	@ °F	@ °F

SCALE CHANGES

TYPE LOG	DEPTH	SCALE UP HOLE	SCALE DOWN HOLE

EQUIPMENT DATA

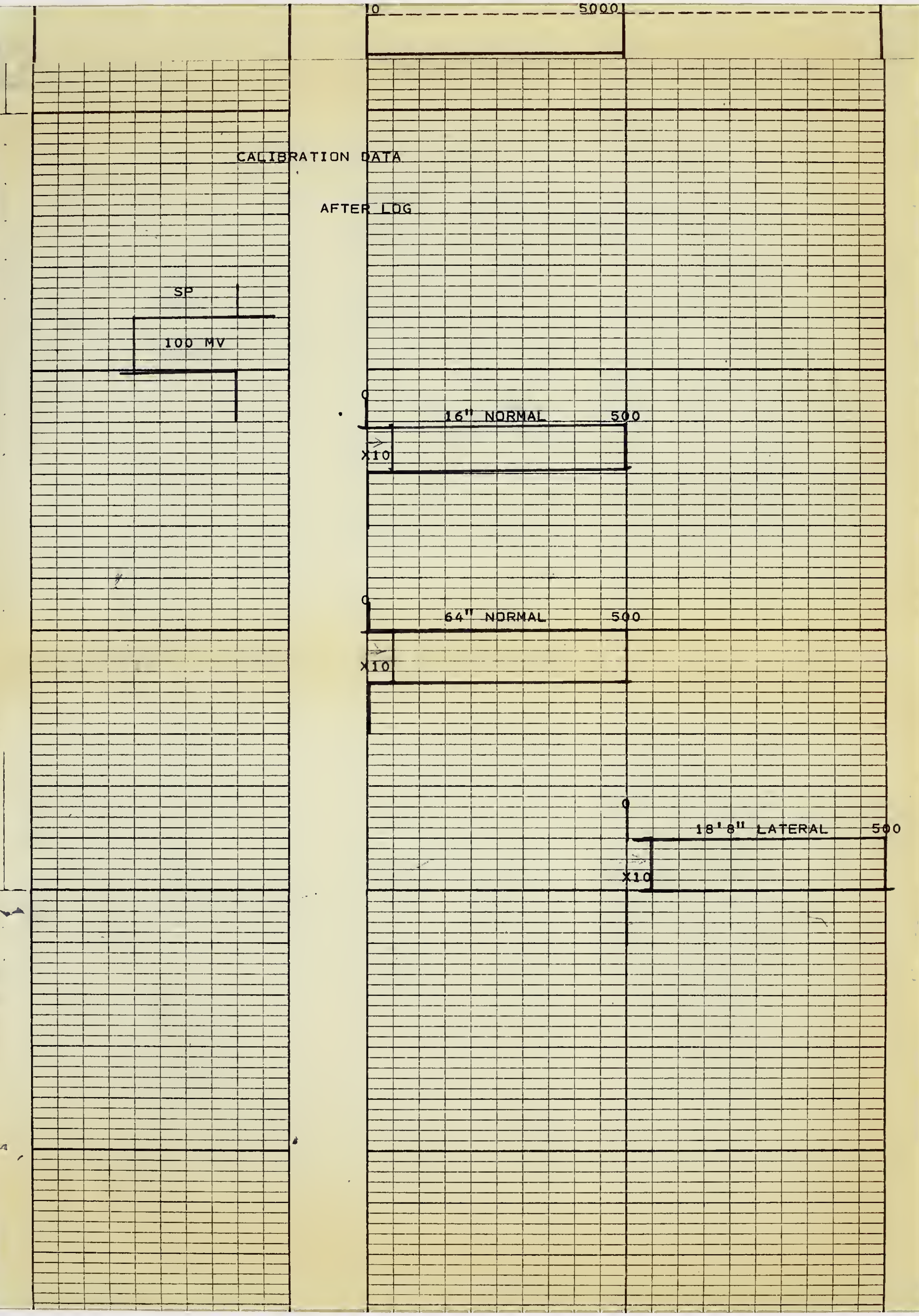
RUN NO.	TOOL TYPE	PAD TYPE	TOOL POSITION	OTHER
ONE	E LOG		FREE	

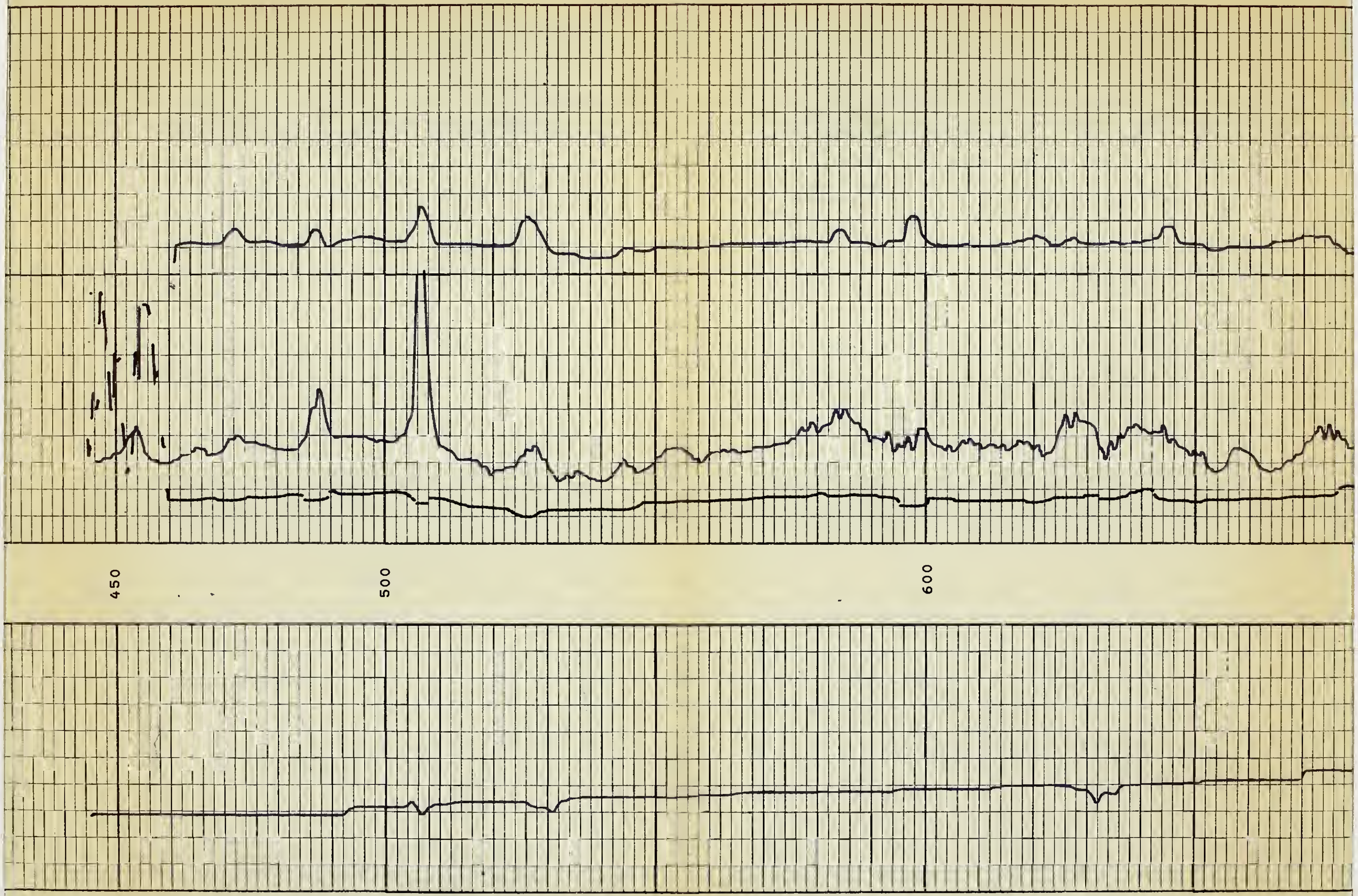
SPONTANEOUS-POTENTIAL
MILLIVOLTS
- |25| +

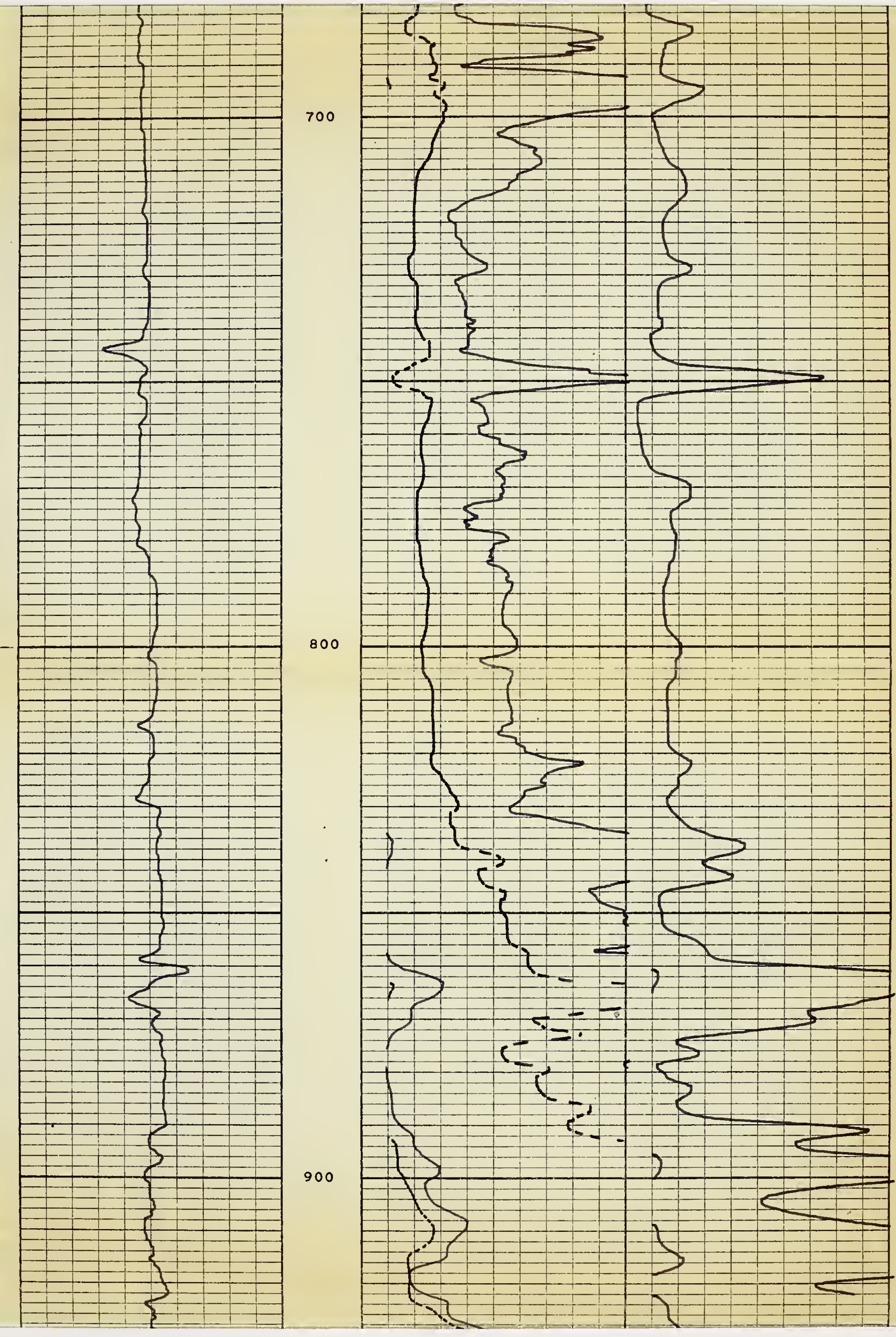
DEPTHS

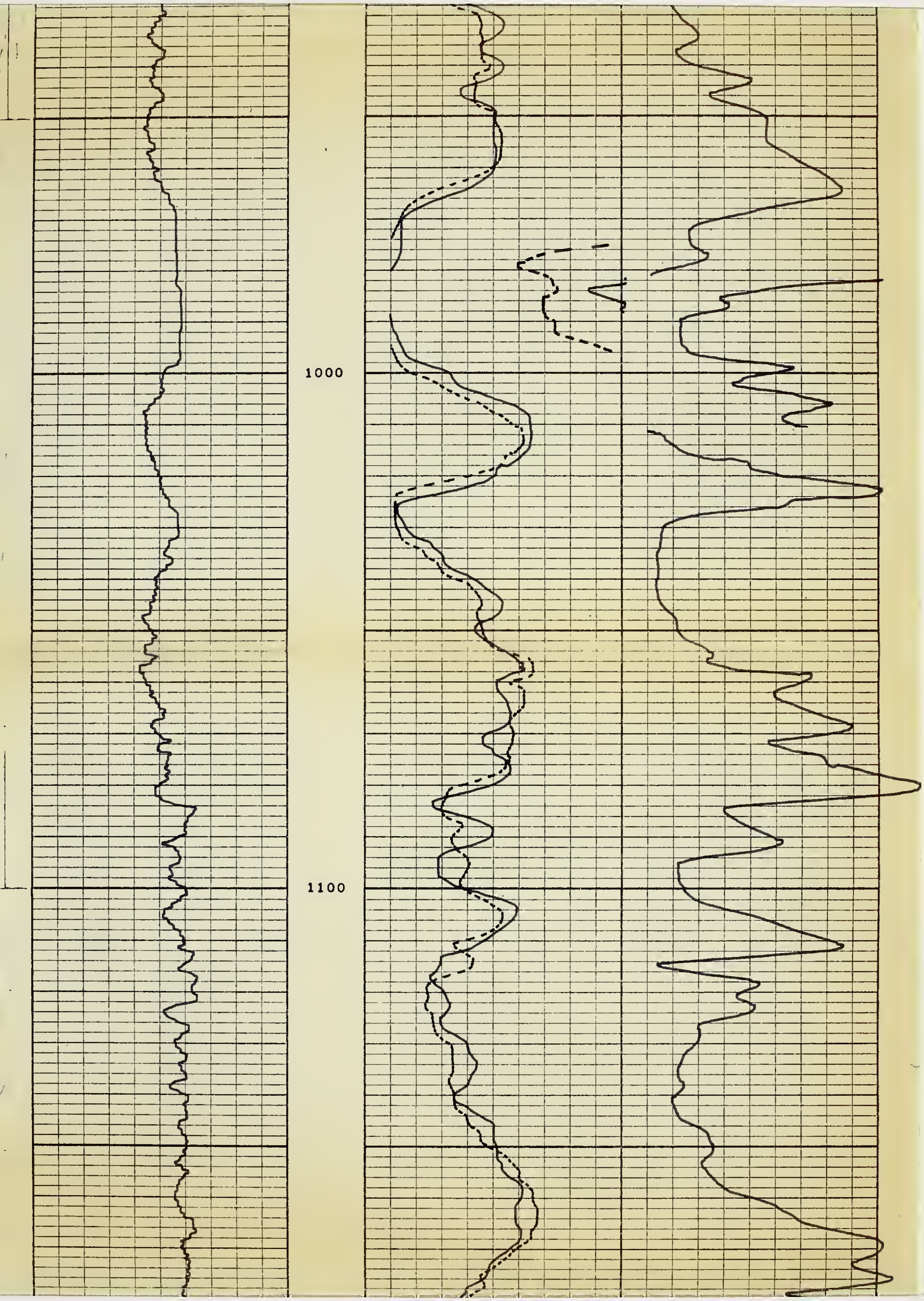
RESISTIVITY
OHMS M²/M
0 16" NORMAL 500
0 5000
0 64" NORMAL 500
0 5000

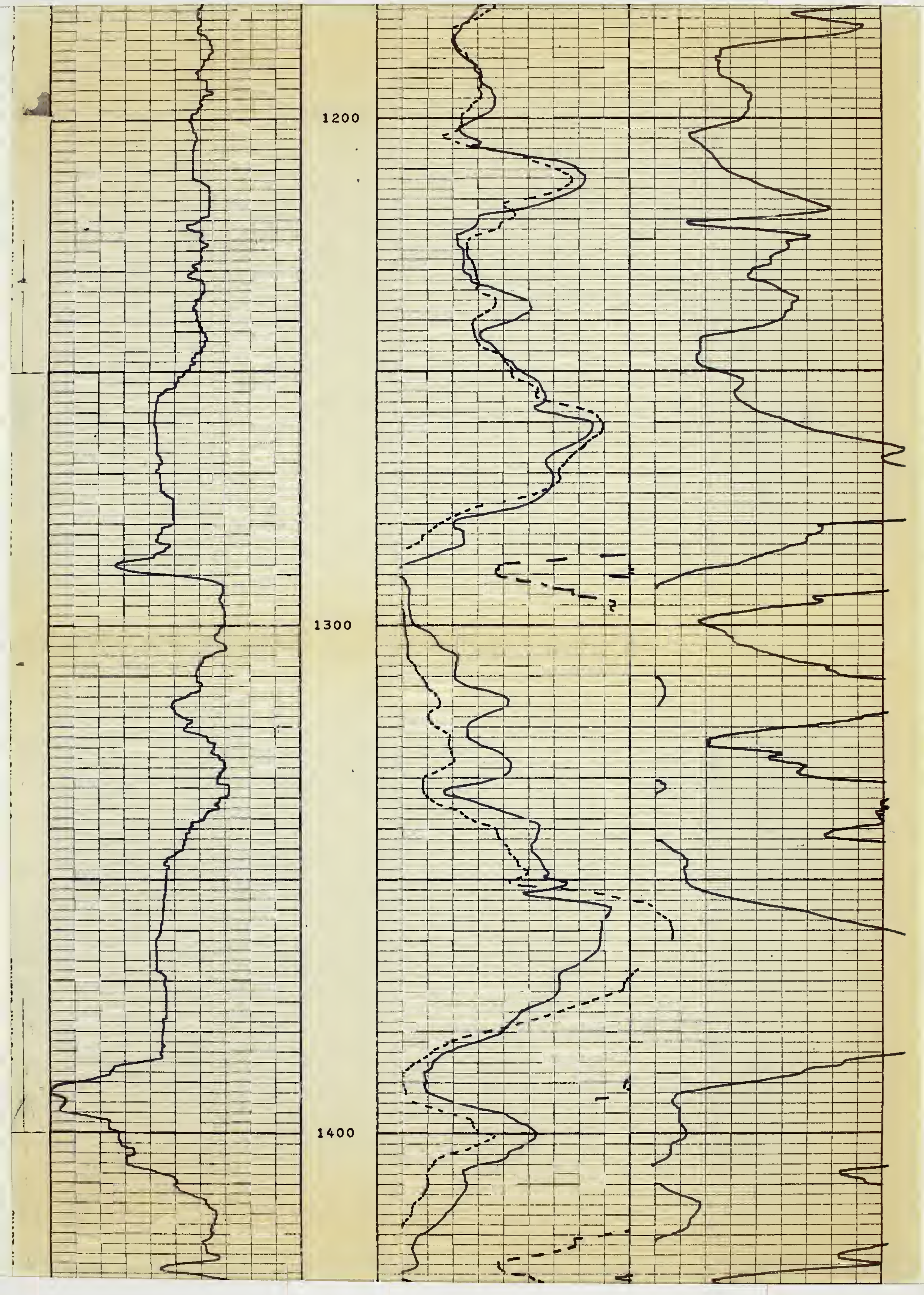
RESISTIVITY
OHMS M²/M
0 18'8" LATERAL 500
0 5000

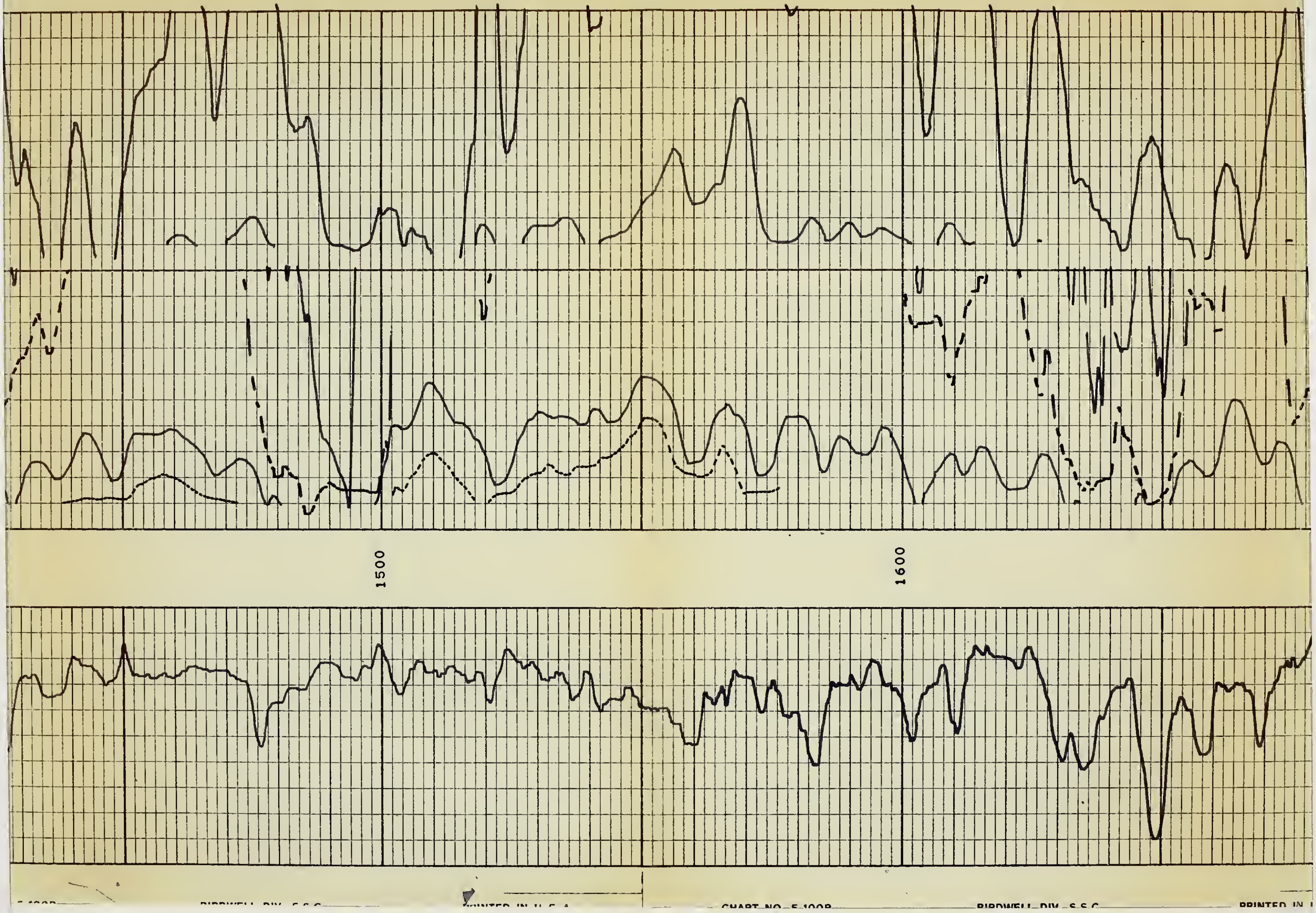

0
5000
CALIBRATION DATA
AFTER LOG
SP
100 MV
0
16" NORMAL
500
X10
0
64" NORMAL
500
X10
0
18'8" LATERAL
500
X10

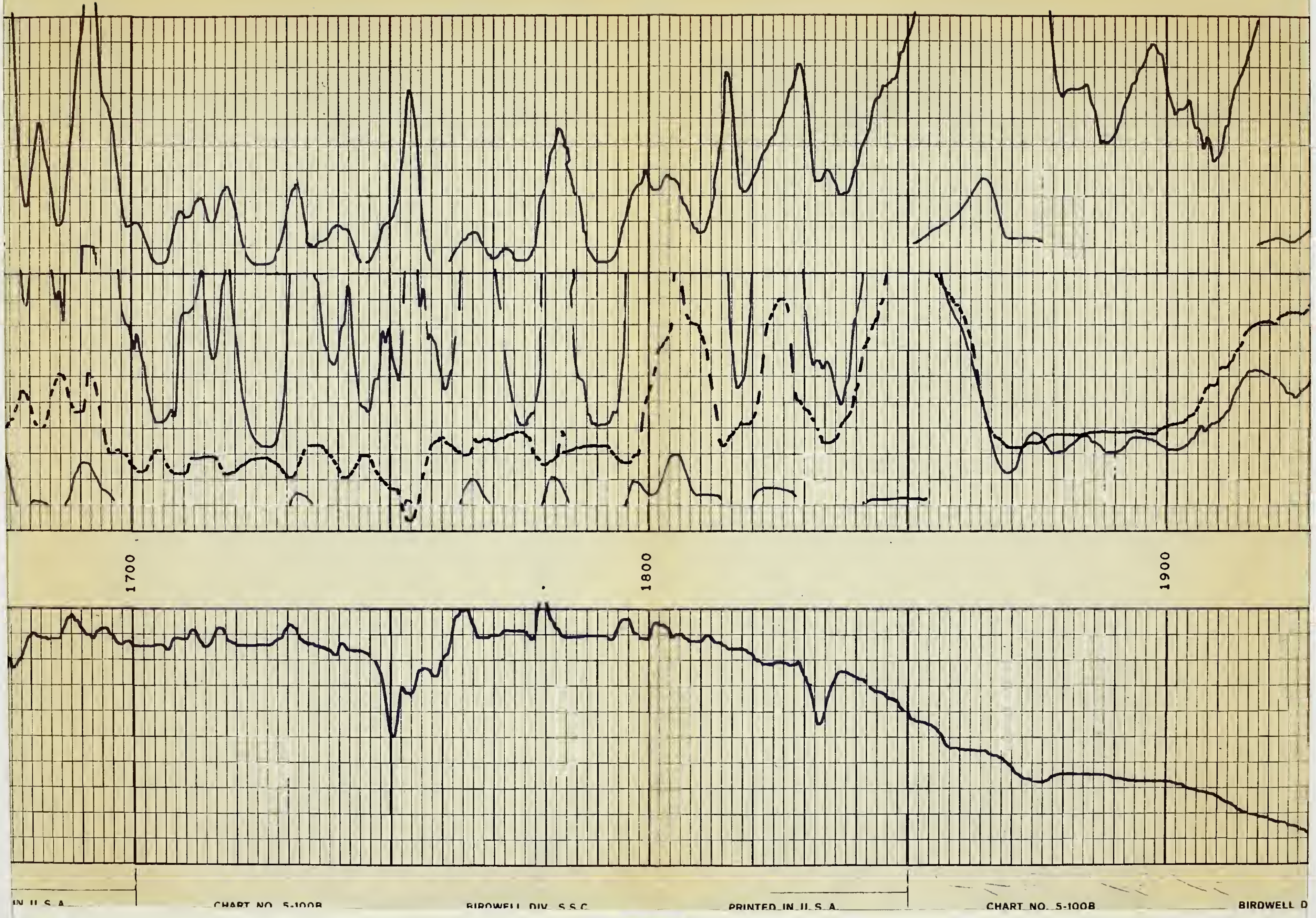

450
500
600

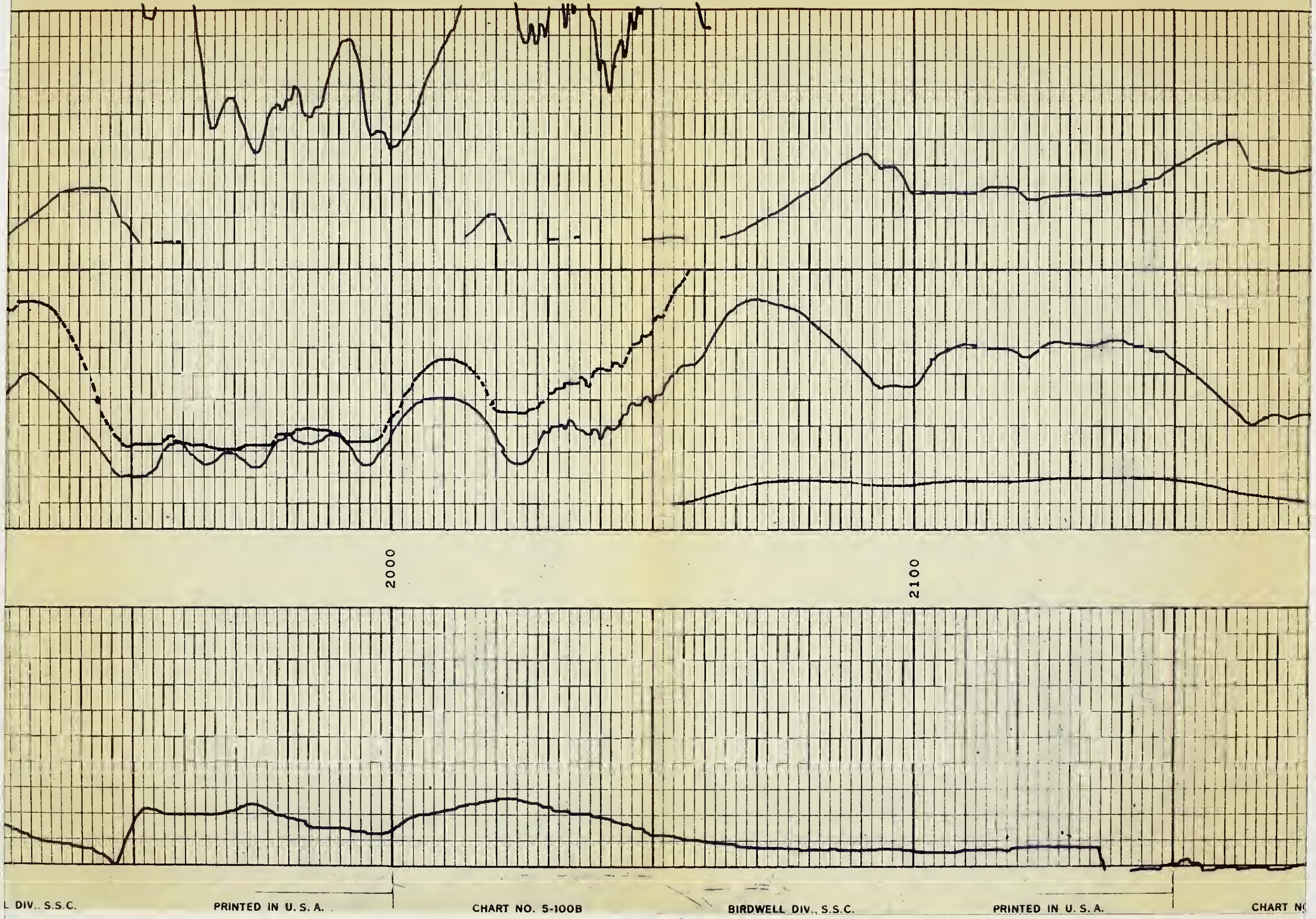

700
800
900

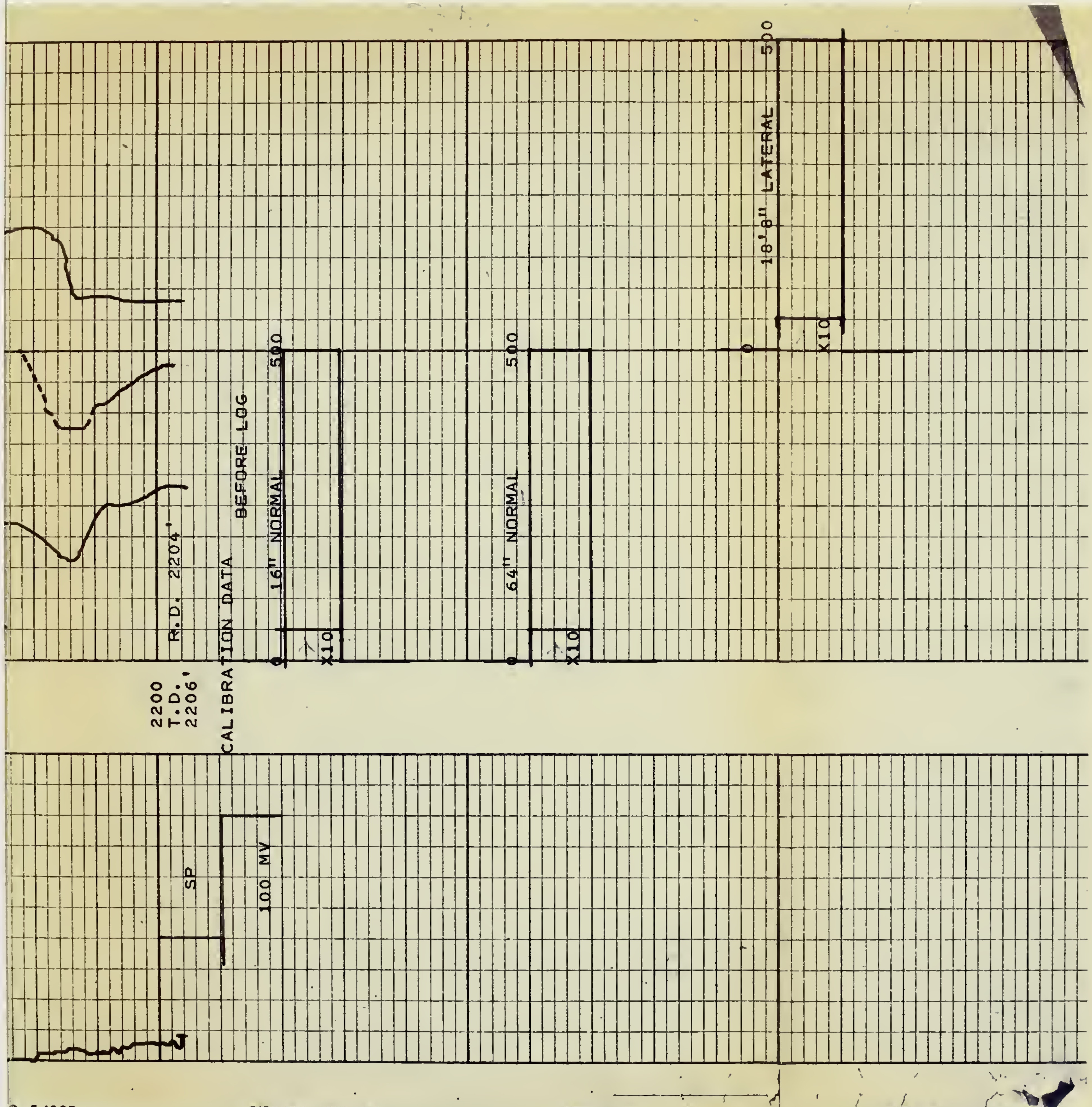

1000
1100


1200
1300
1400


1500
1600
BIRDWELL DIV. S.S.C.
PRINTED IN U.S.A.
CHART NO. 5-100B
BIRDWELL DIV. S.S.C.
PRINTED IN


1700
1800
1900
IN U.S.A.
CHART NO. 5-100B
BIRDWELL DIV. S.S.C.
PRINTED IN U.S.A.
CHART NO. 5-100B
BIRDWELL D


2000
2100
L DIV., S.S.C.
PRINTED IN U.S.A.
CHART NO. 5-100B
BIRDWELL DIV., S.S.C.
PRINTED IN U.S.A.
CHART N



O. 5-100B BIRDWELL DIV., S.S.C. PRINTED IN U.S.A. CHART NO. S-100B

Birdwell

3-Dimensional Velocity Log

FILING NO.

COMPANY ATLANTIC RICHFIELD COMPANY, ET. AL.

WELL SORGHUM GULCH #H-10

FIELD

COUNTY RIO BLANCO STATE COLORADO

LOCATION: 97' FNL & 184' FEL

SEC. 13 TWP. 3S RGE. 97W

OTHER SERVICES: CAL FDL TL ES GR/ENP

ELEVATIONS
KB.
DF.
GL. 6950'

PERMANENT DATUM GROUND LEVEL ELEV. 6950'
LOG MEASURED FROM GL
DRILLING MEASURED FROM GL

DATE	29 JUNE 74	29 JUNE 74	
RUN NO.	1	2	
TYPE LOG—BOND OR VEL.	V3D	V3D	
DEPTH — DRILLER	2211	2211	
DEPTH — LOGGER	2206	2206	
BOTTOM LOGGED INTERVAL	2200	2200	
TOP LOGGED INTERVAL	450	450	
TYPE FLUID IN HOLE	WATER	WATER	
SALINITY PPM CL.			
DENSITY LB./GAL.			
LEVEL	394'	394'	
MAX. REC. TEMP. — DEG. F.	98°	98°	
OPR. RIG TIME	1 HOUR TOTAL TIME		
RECORDED BY	WILSON	WILSON	
WITNESSED BY	TAIT	TAIT	
LOCATION	LAS VEGAS	LAS VEGAS	

RUN NO.	BORE HOLE RECORD BIT	FROM	TO	CASING RECORD SIZE	WGT.	FROM	TO
1				7"		0	62'
	5-5/8"	62'	1200'				
	4-7/8"	1200'	2211'				

EQUIPMENT DATA

SURFACE

RUN NO.	1	2
CAMERA MODEL NO.	LLAD	LLAD
SWEEP DELAY — µSEC.	0	100
TOTAL SWEEP TIME — µSEC.	2000	2000
LOGGING SPEED FT./MIN.		
DEPTH SCALE FT./MARK		
TIMING LINES	100	100

SUB-SURFACE

RUN NO.	1	2
TX TRANSDUCER SIZE	3-5/8"	3-5/8"
ISOLATOR LENGTH	27-3/4"	57"
CENTER TO CENTER	37-3/4"	67"
BUMPER O.D.		
BOREHOLE GAIN — /DB	3RD	3RD

GENERAL

HOIST TRUCK NO.	2694	2694
INST. TRUCK NO.	2694	2694
STATION	LAS VEGAS	LAS VEGAS

CEMENTING DATA

DATE, PRIMARY
TYPE CEMENT
AMOUNT
ADDITIVES BY %
DATE, SQUEEZE
TYPE CEMENT
AMOUNT
ADDITIVES BY %

WELL DATA

TYPE WELL
COMPLETION DATE
WELL DRILLED WITH ROTARY ☒ CABLE T. ☐

REMARKS

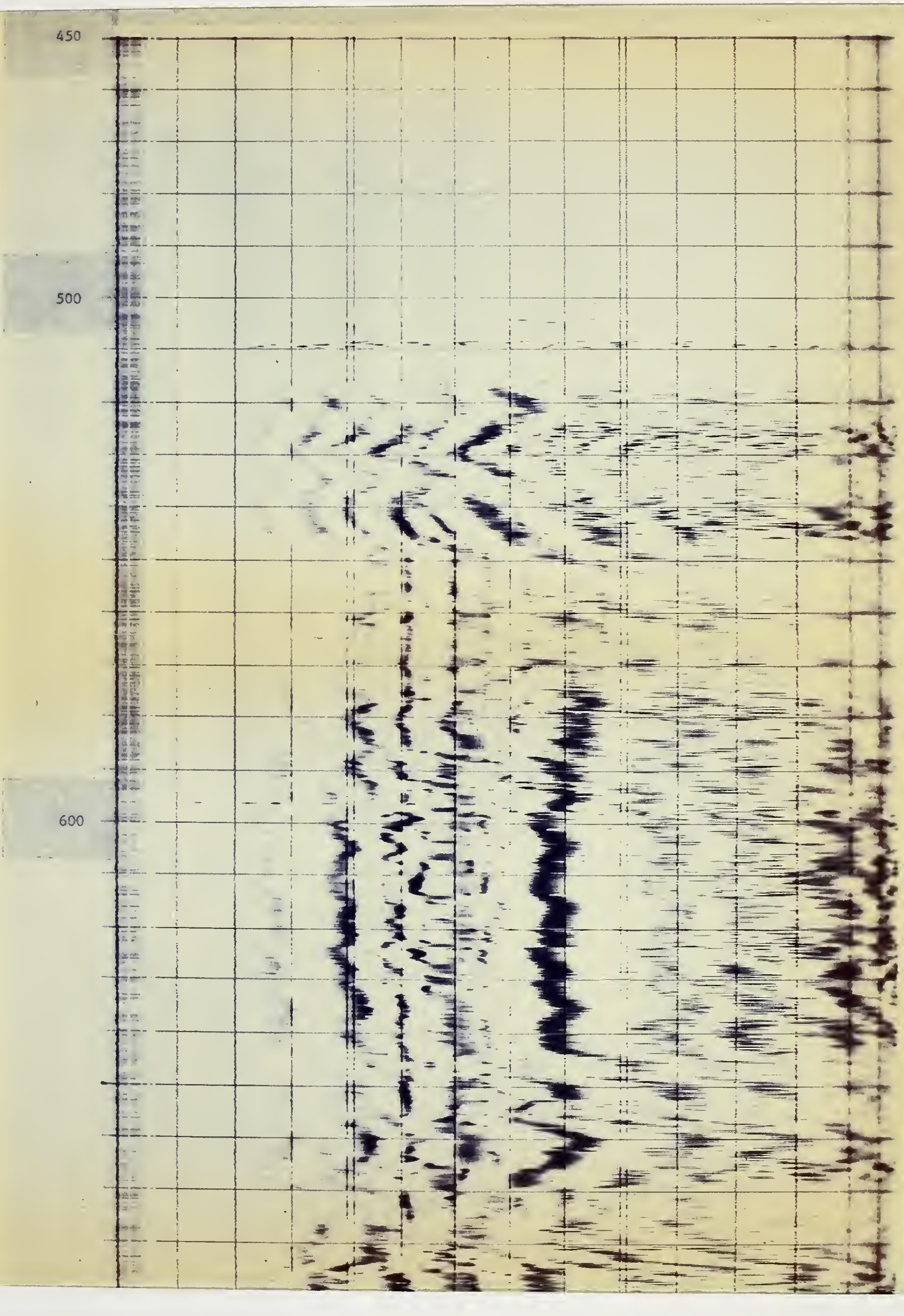
MICROSECONDS INCREASING →

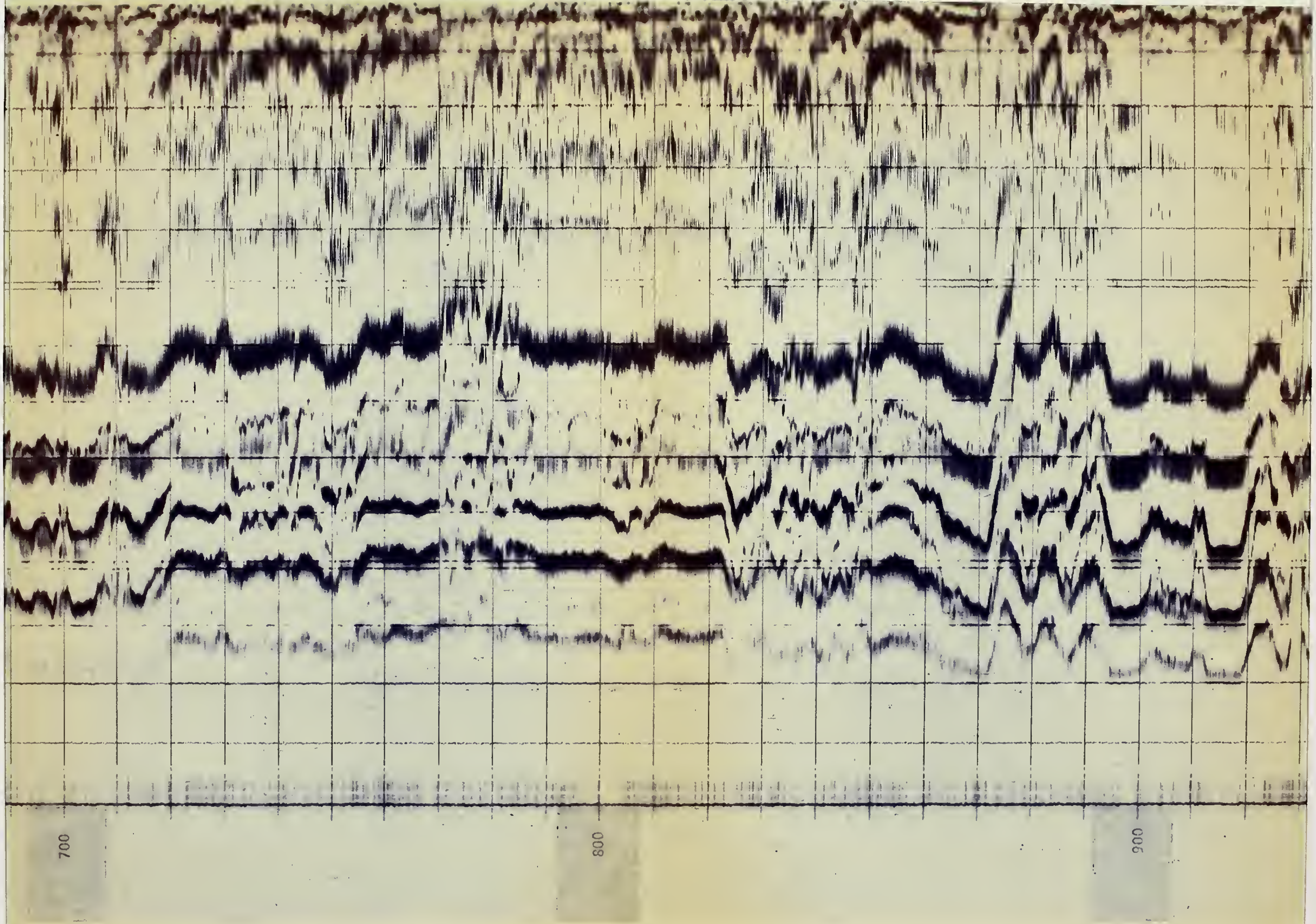
RUN # 1 3' SPACING

500 1000

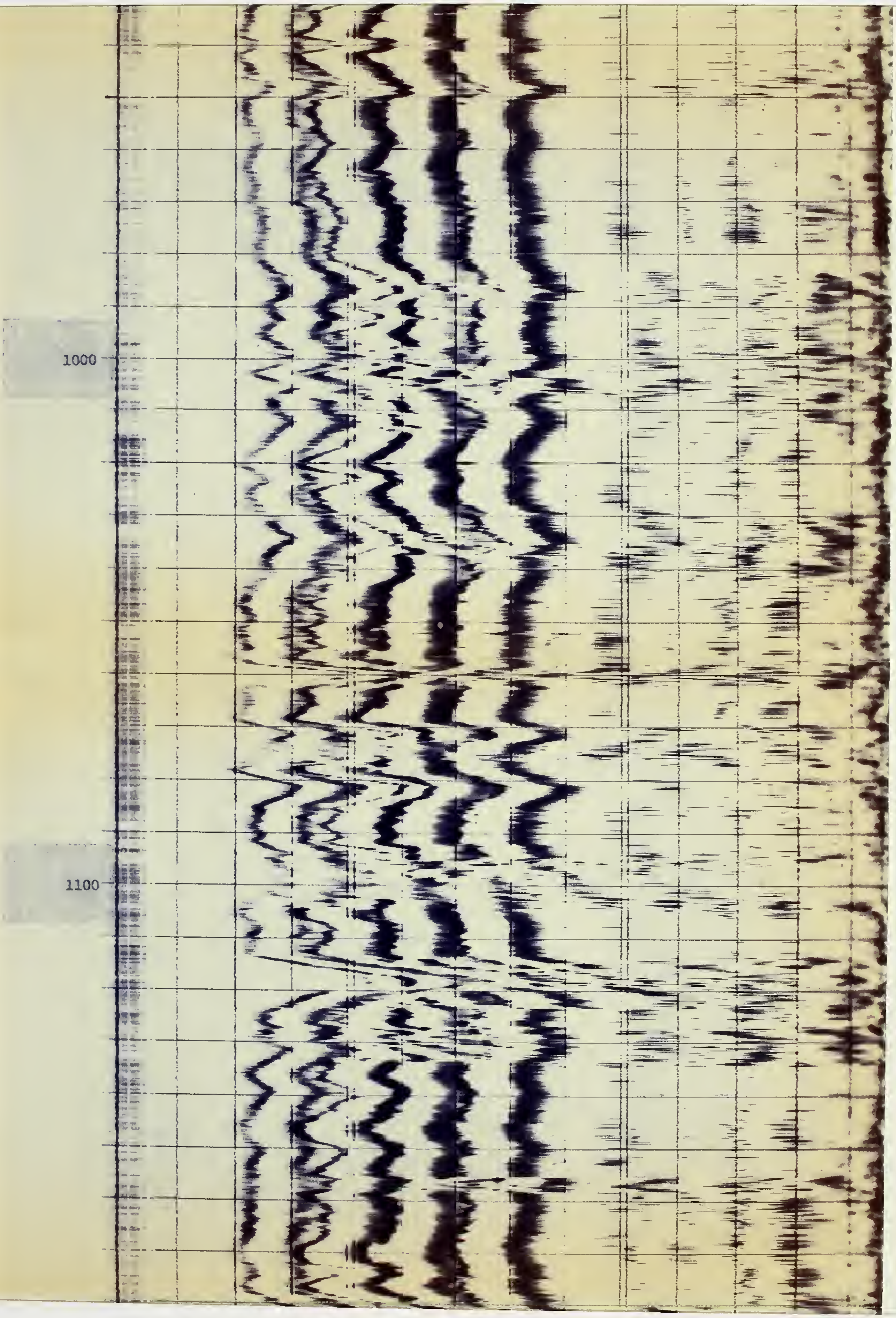
DEPTH

SSC-636-1-A


450
500
600



700
800
900


1000
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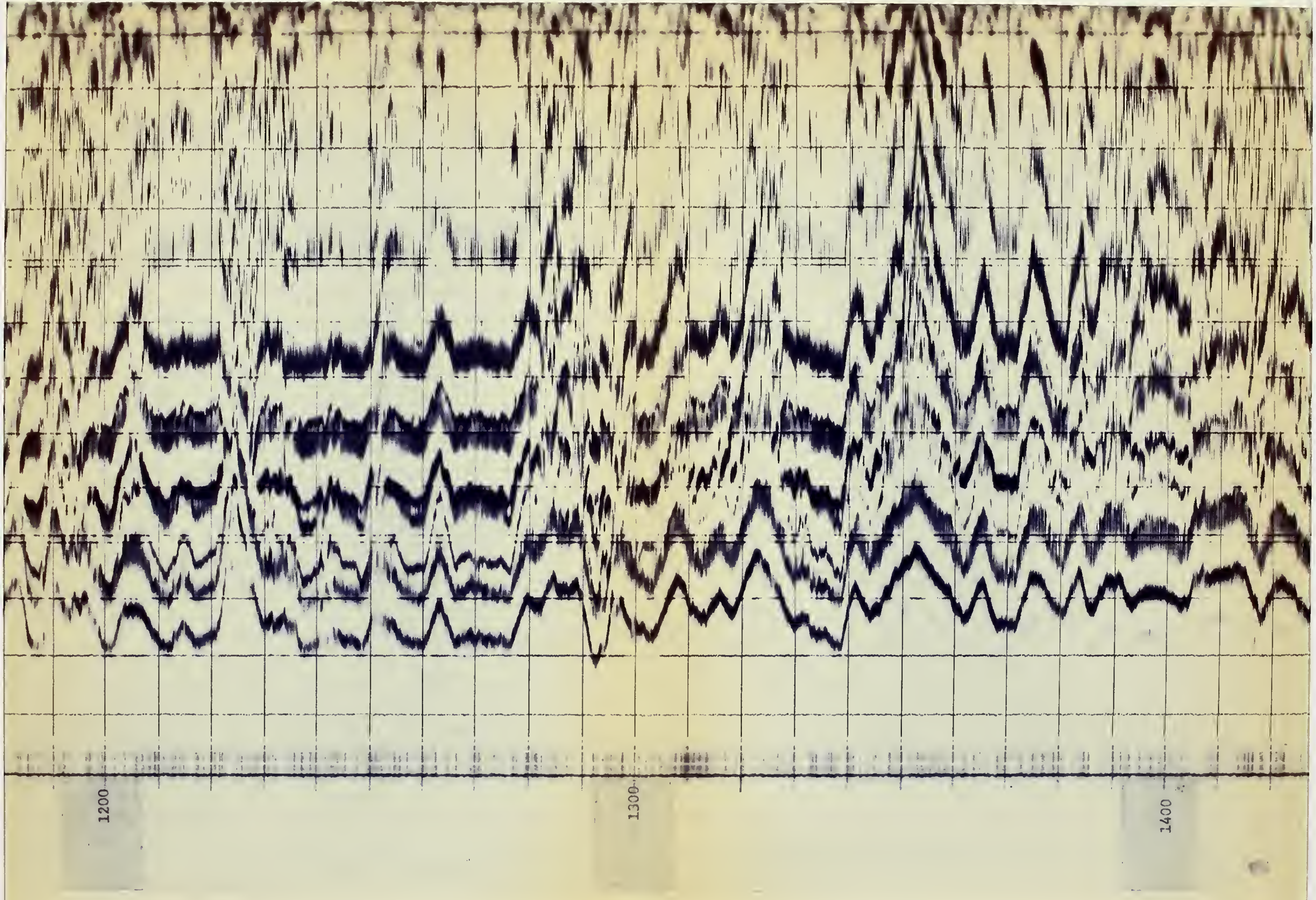
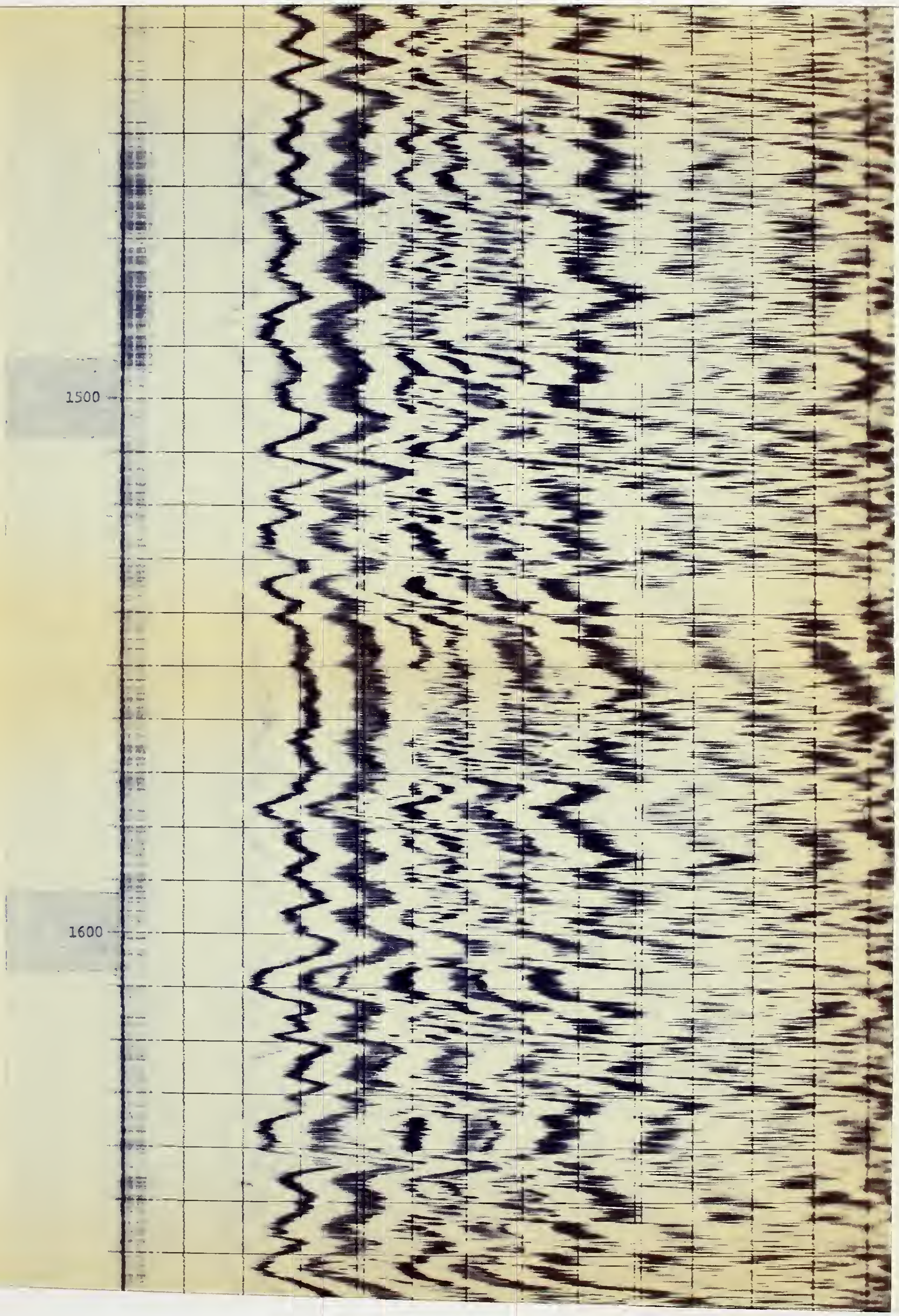
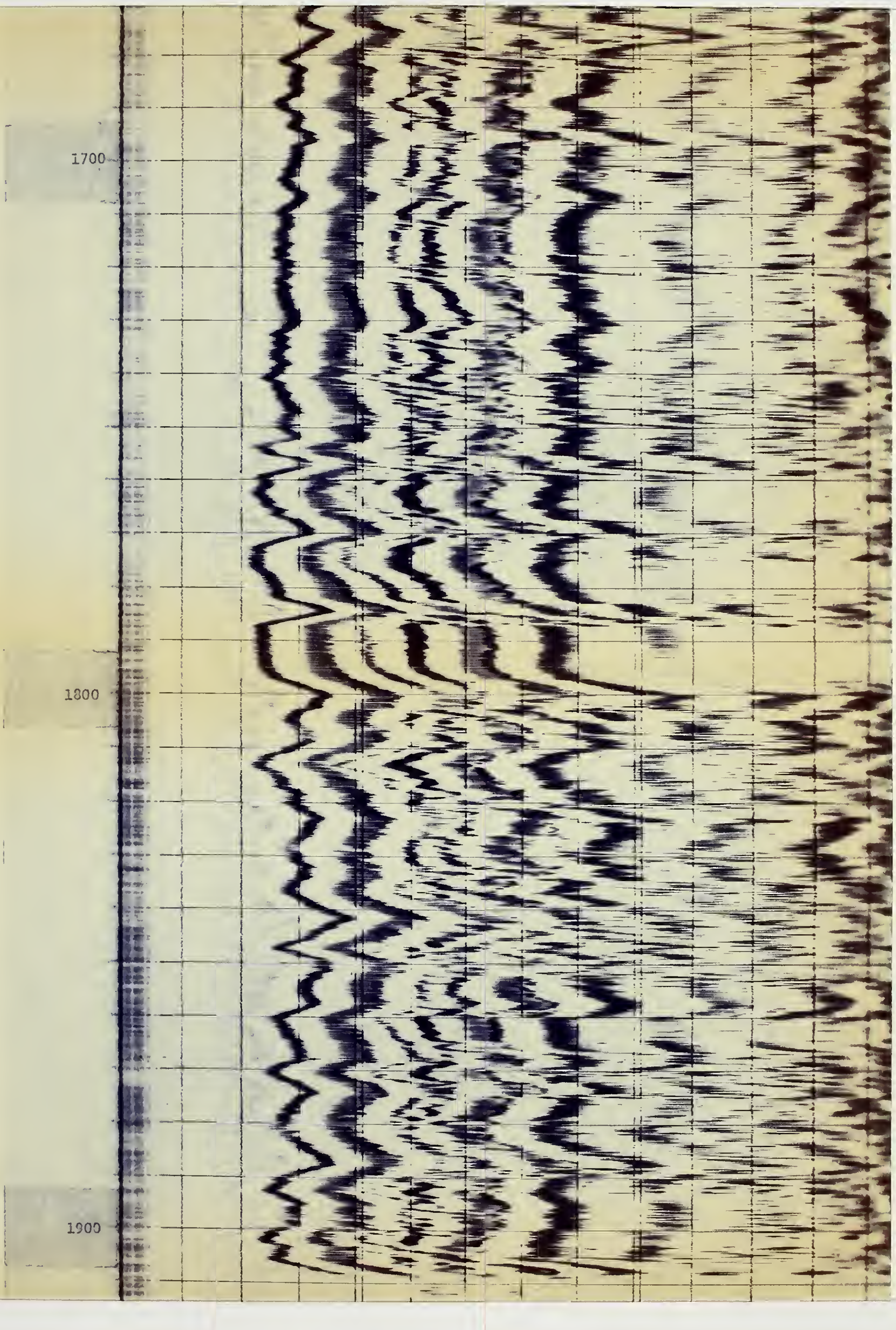
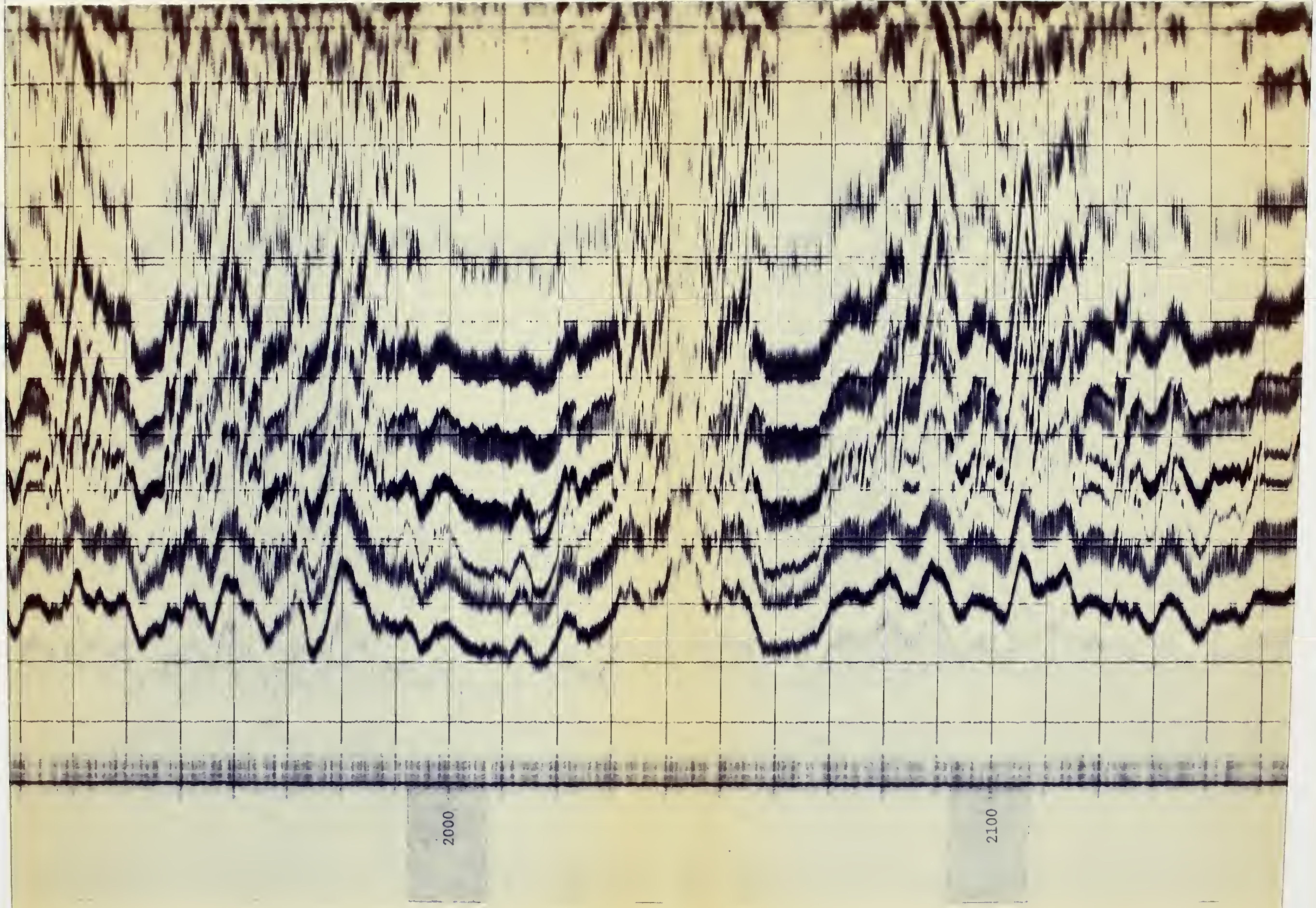
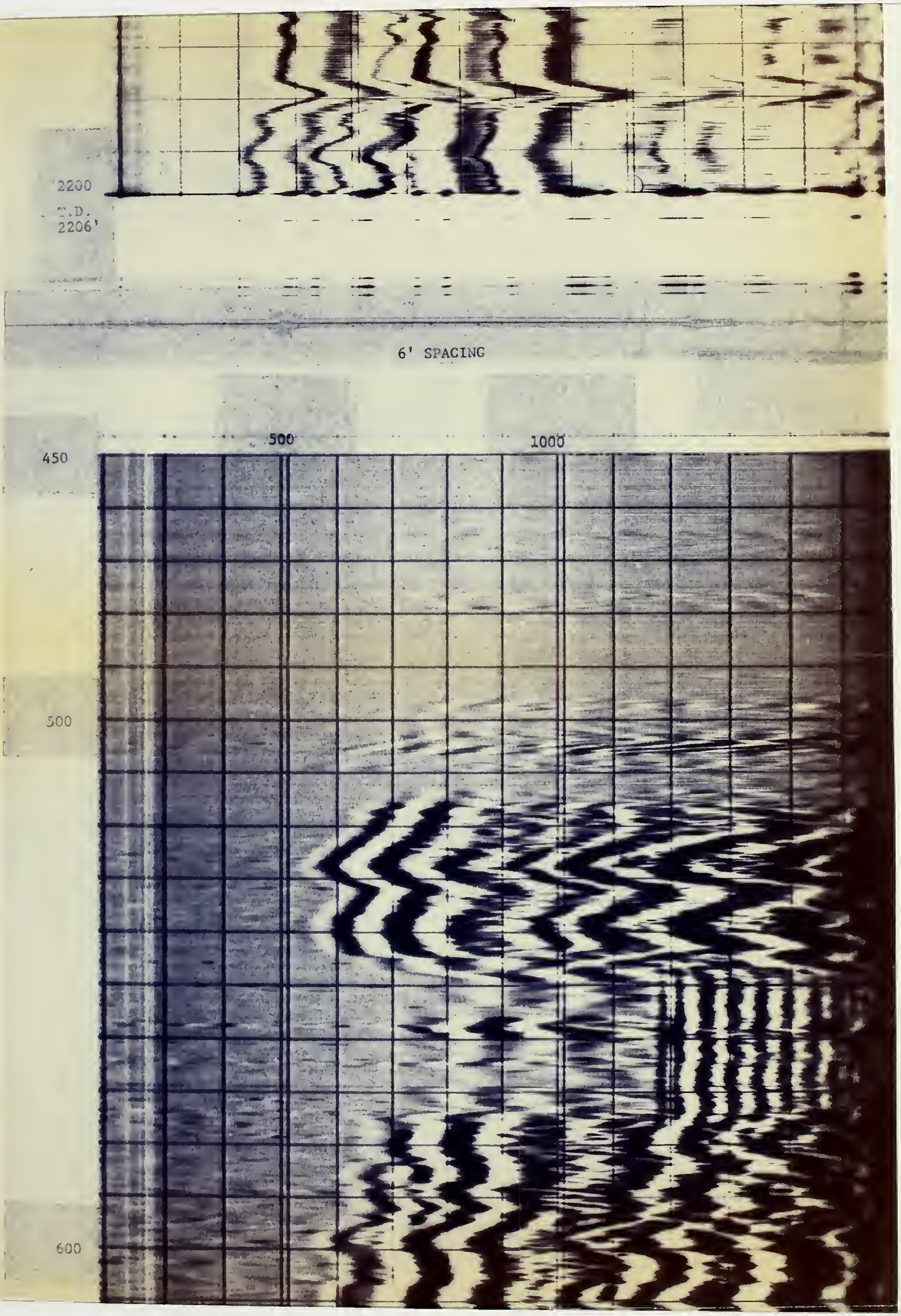
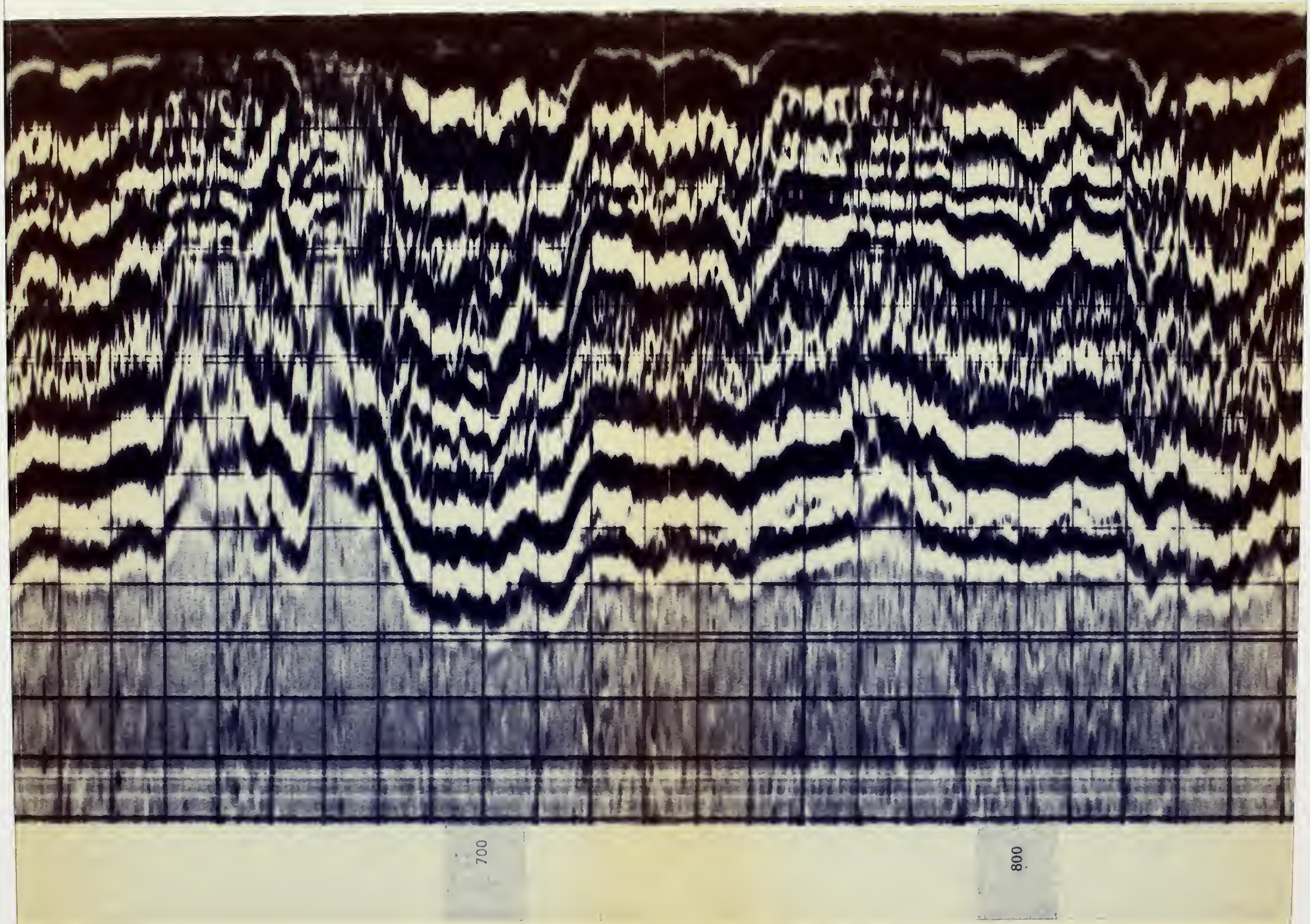

1200
1300
1400

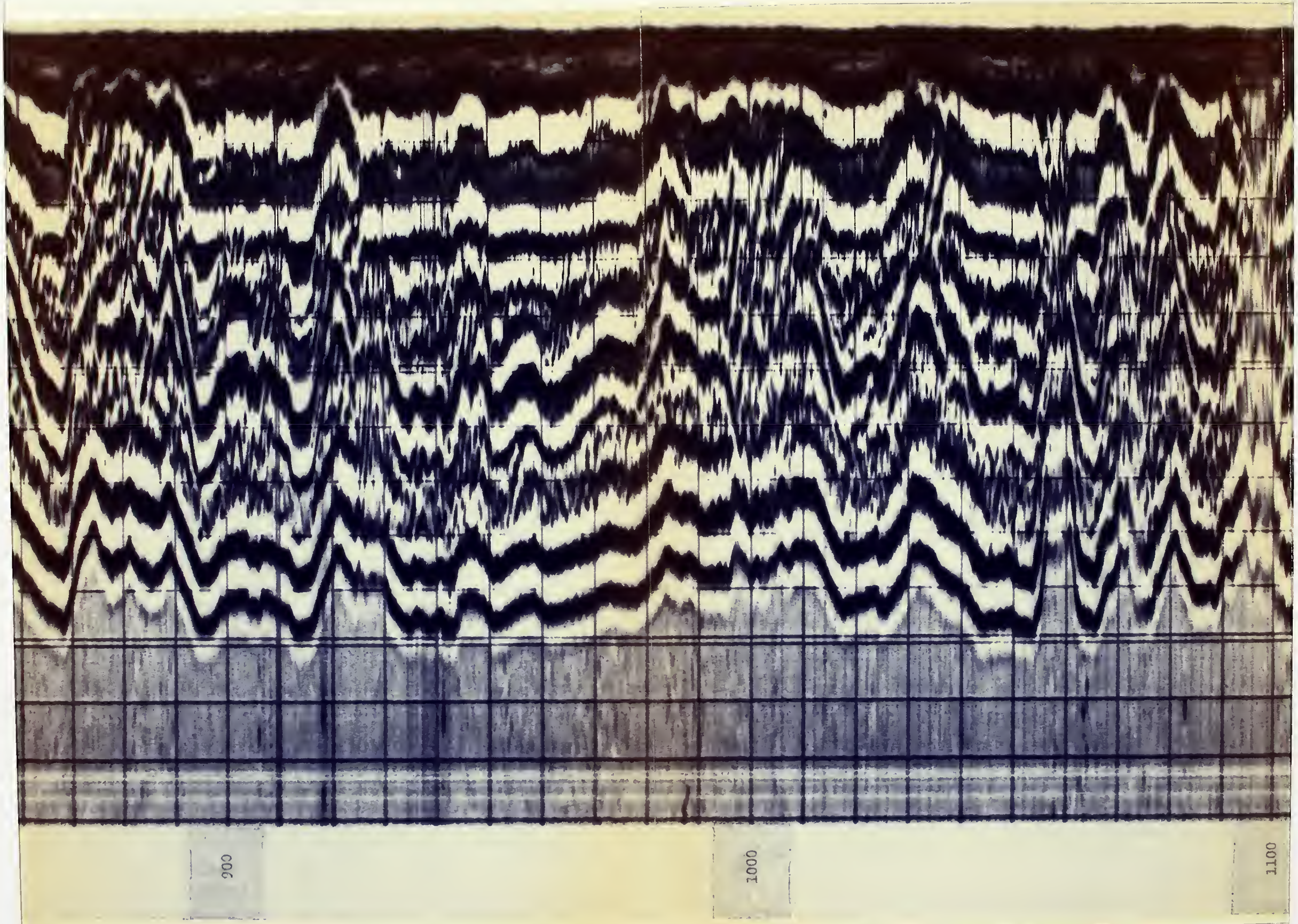

1500
1600

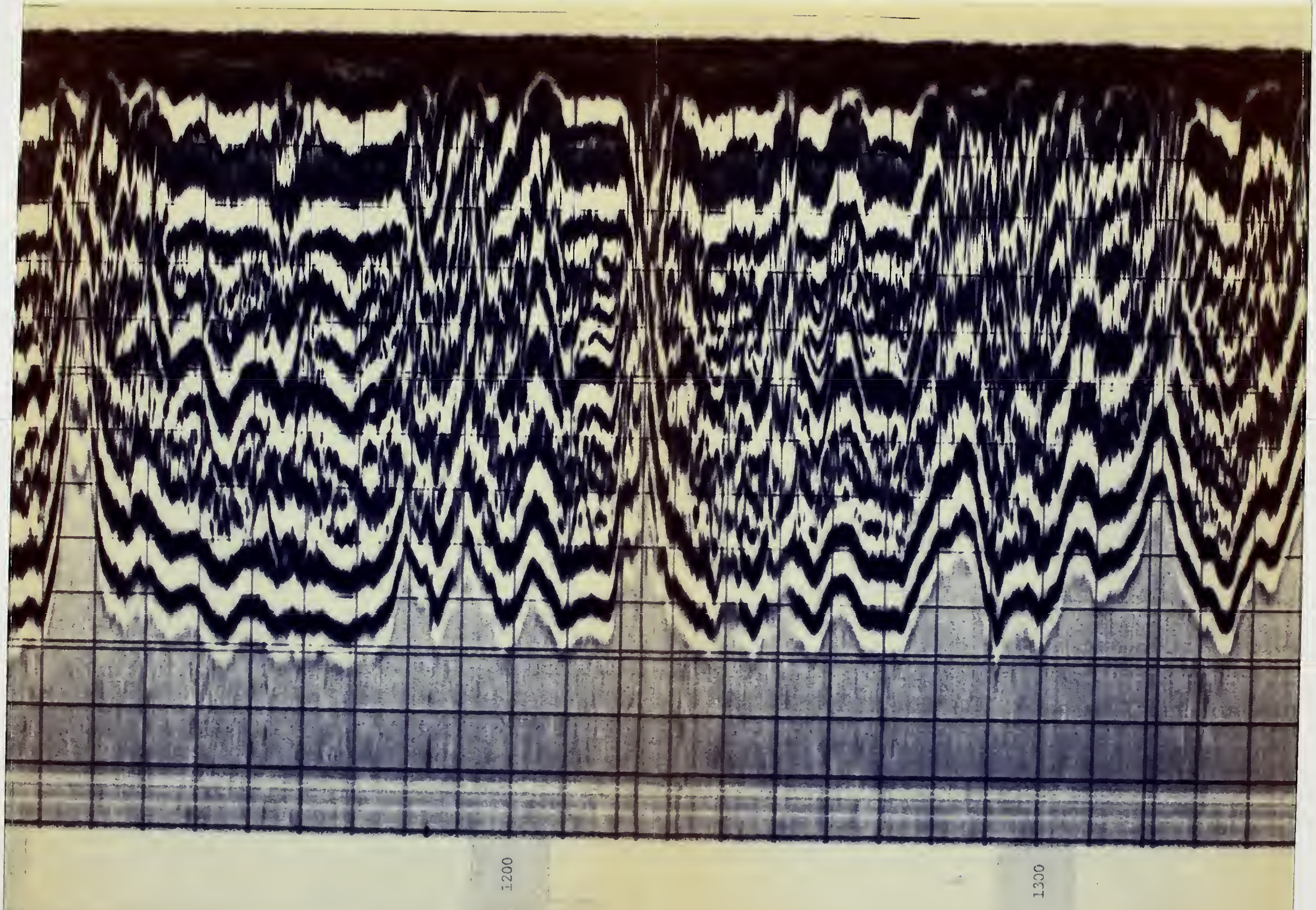

1700
1800
1900


2000
2100


2200
T.D.
2206'
6' SPACING
500
1000
450
500
600


700
800


900
1000
1100


1200
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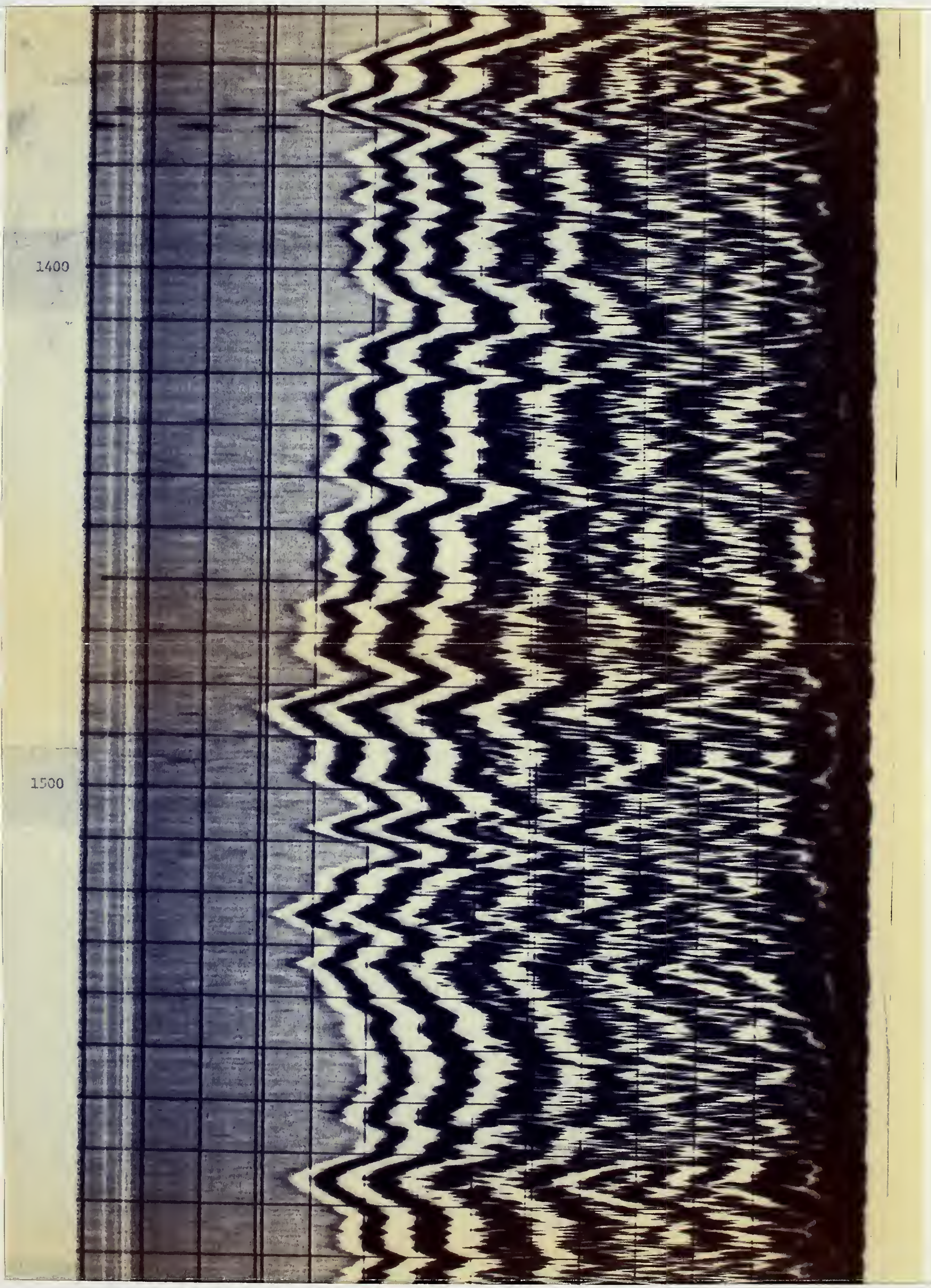
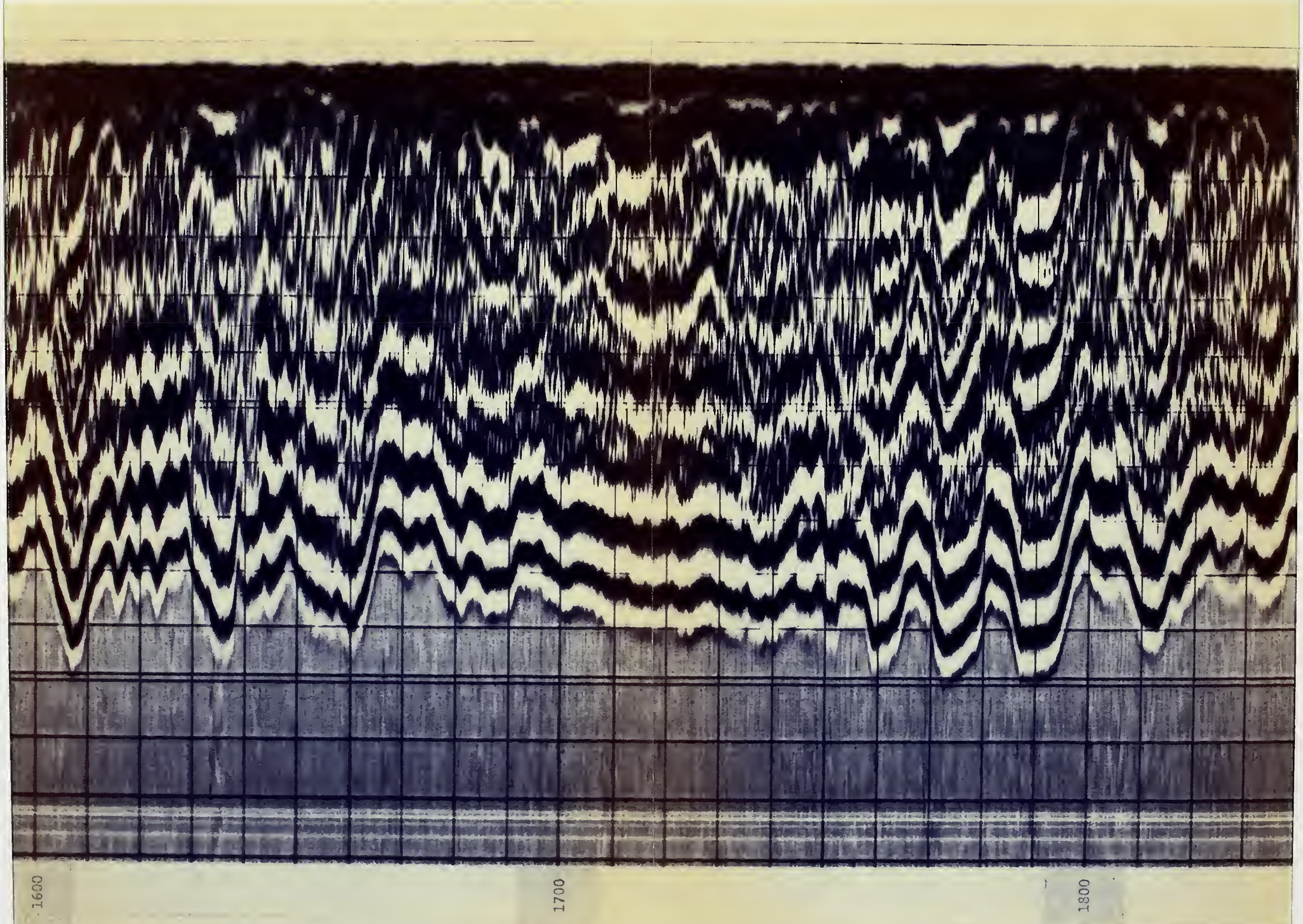
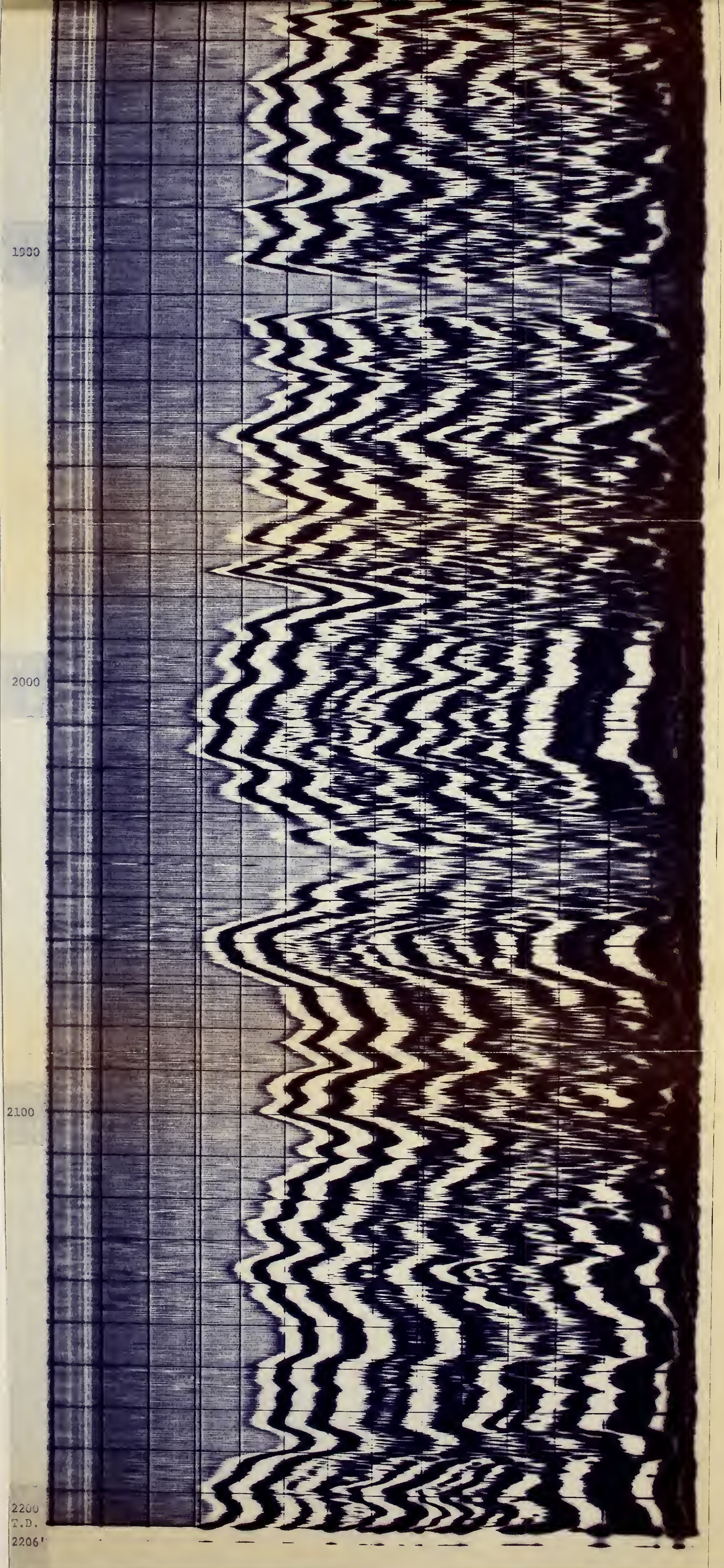

1400
1500


1600
1700
1800


1900
2000
2100
2200
T.D.
2206'

Birdwell

Density Log

COMPANY ATLANTIC RICHFIELD COMPANY, ET. AL.

WELL SORGHUM GULCH #H-10

FIELD

COUNTY RIO BLANCO **STATE** COLORADO

LOCATION: 97' FNL & 184' FEL

OTHER SERVICES V3D CAL TL GR/ENP ES

SEC. 13 **TWP.** 3S **RGE.** 97W

ELEVATIONS:
KB.
DF.
GL. 6950'

PERMANENT DATUM GROUND LEVEL, **ELEV.** 6950'
LOG MEASURED FROM GL, ft. above perm. datum
DRILLING MEASURED FROM GL

DATE	29 JUNE 74		
RUN NO.	1		
TYPE LOG	FDL		
DEPTH – DRILLER	2211		
DEPTH – LOGGER	2206		
BOTTOM LOGGED INTERVAL	2204		
TOP LOGGED INTERVAL	60		
TYPE FLUID IN HOLE	WATER		
SALINITY PPM CL.	1		
DENSITY LB./GAL.			
LEVEL	394		
MAX. REC. TEMP. – DEG. F	98°		
OPERATING RIG TIME	2 HRS.		
RECORDED BY	WILSON		
WITNESSED BY	TAIT		
LOCATION	LAS VEGAS		

RUN NO.	BORE HOLE RECORD			CASING RECORD			
	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1				7"		0	62'
	5-5/8"	62'	1200'				
	4-7/8"	1200'	2211'				

SSC-647-C

GAMMA-GAMMA EQUIPMENT DATA

RUN NO.	1		
TOOL MODEL NO.	LAHD		
TOOL SERIAL NO.	W-11		
DIAMETER	3-5/8"		
SUB	PB		
DETECT. MODEL NO.	9371 TN		

TOOL SPACING	19"		
SOURCE NO.	V-476		
DIRECT ZERO LOC.			
DISTANCE D OR D′	13"		
NOMINAL HOLE DIAM.	5"		
TRUCK NO.	2694		

GAMMA-GAMMA LOGGING DATA

RUN NO.	DEPTHS FROM	DEPTHS TO	SPEED FT./MIN.	TC SEC.	CPM FULL SCALE	DIRECT CPM /DIV.	LINEAR GMS./DIV.
1	2204'	60'	20	3	10×10^4		.05

PRIMARY REFERENCE	A-14	M-107
EQUIVALENT DEN. G/CC	2.598	1.742
SECONDARY REF.		
EQUIVALENT DEN. G/CC		
KCPM BEFORE LOG		
KCPM AFTER LOG		
RECORDER CAL. REF.	25K	50K
EQUIVALENT DEN. G/CC	2.34	2.6

REMARKS: THIS WORK WAS PERFORMED UNDER UNITED STATES ATOMIC ENERGY COMMISSION BY-PRODUCT MATERIAL LICENSE NO. 35-5651-1

GRAIN DENSITY GMS/CC:
FLUID DENSITY GMS/CC:

NA: INFORMATION NOT AVAILABLE

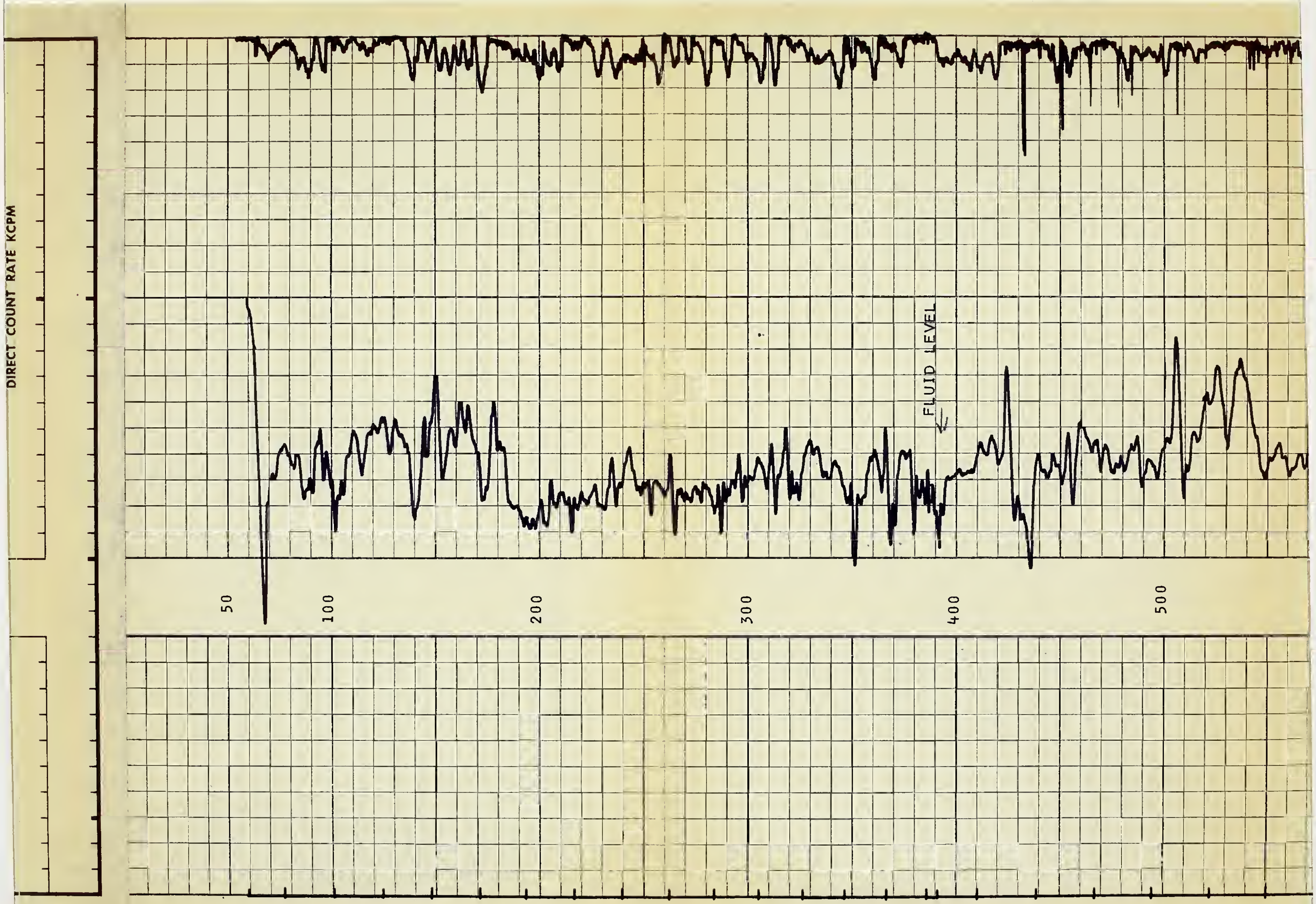
NOTE: RECORDED BULK DENSITY MUST BE CORRECTED FOR STANDOFF (PROXIMITY INDEX)

DEPTH

PROXIMITY INDEX
INCHES
1 0

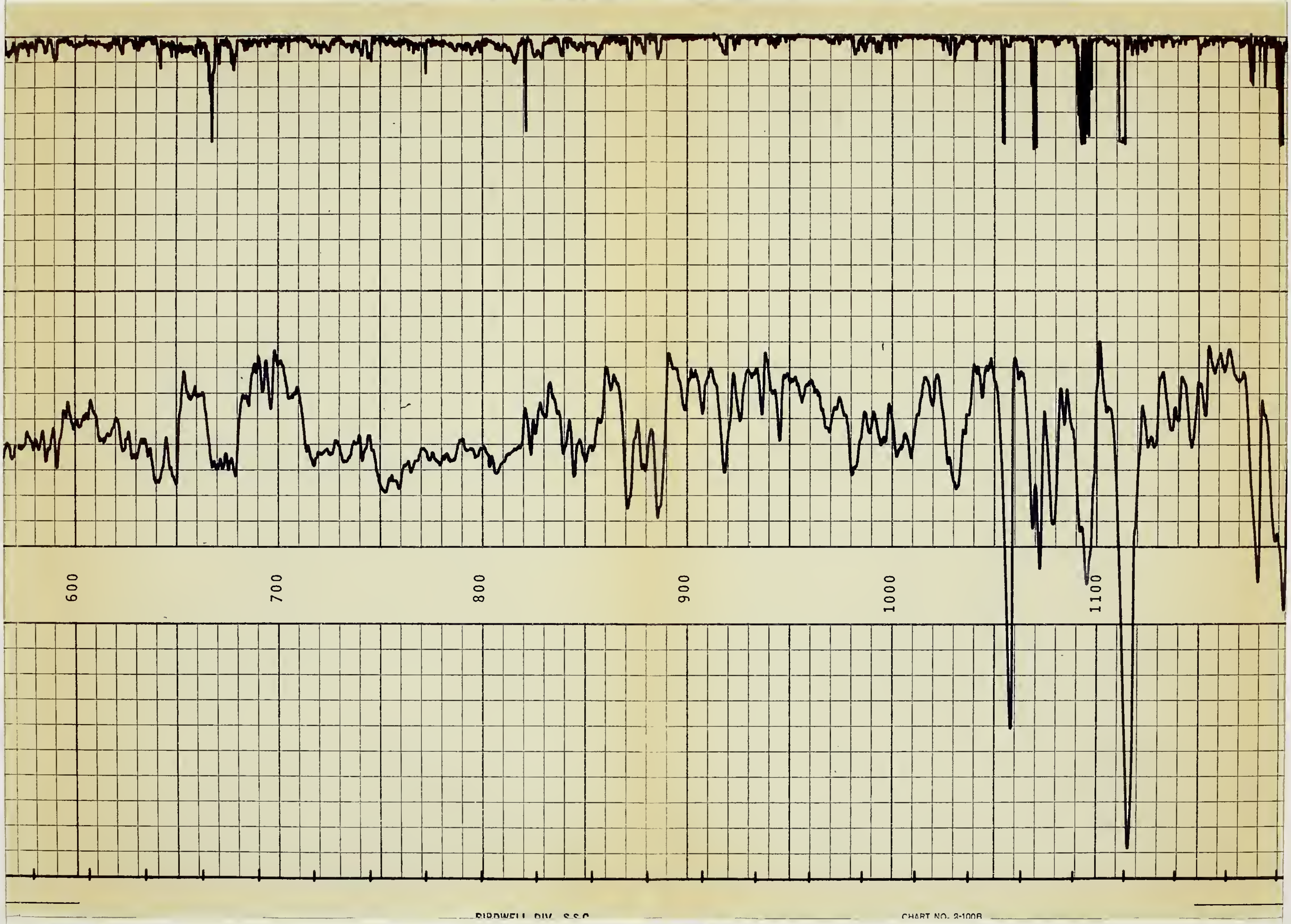
BULK DENSITY
GRAMS/CC
2.0 2.5 3.0

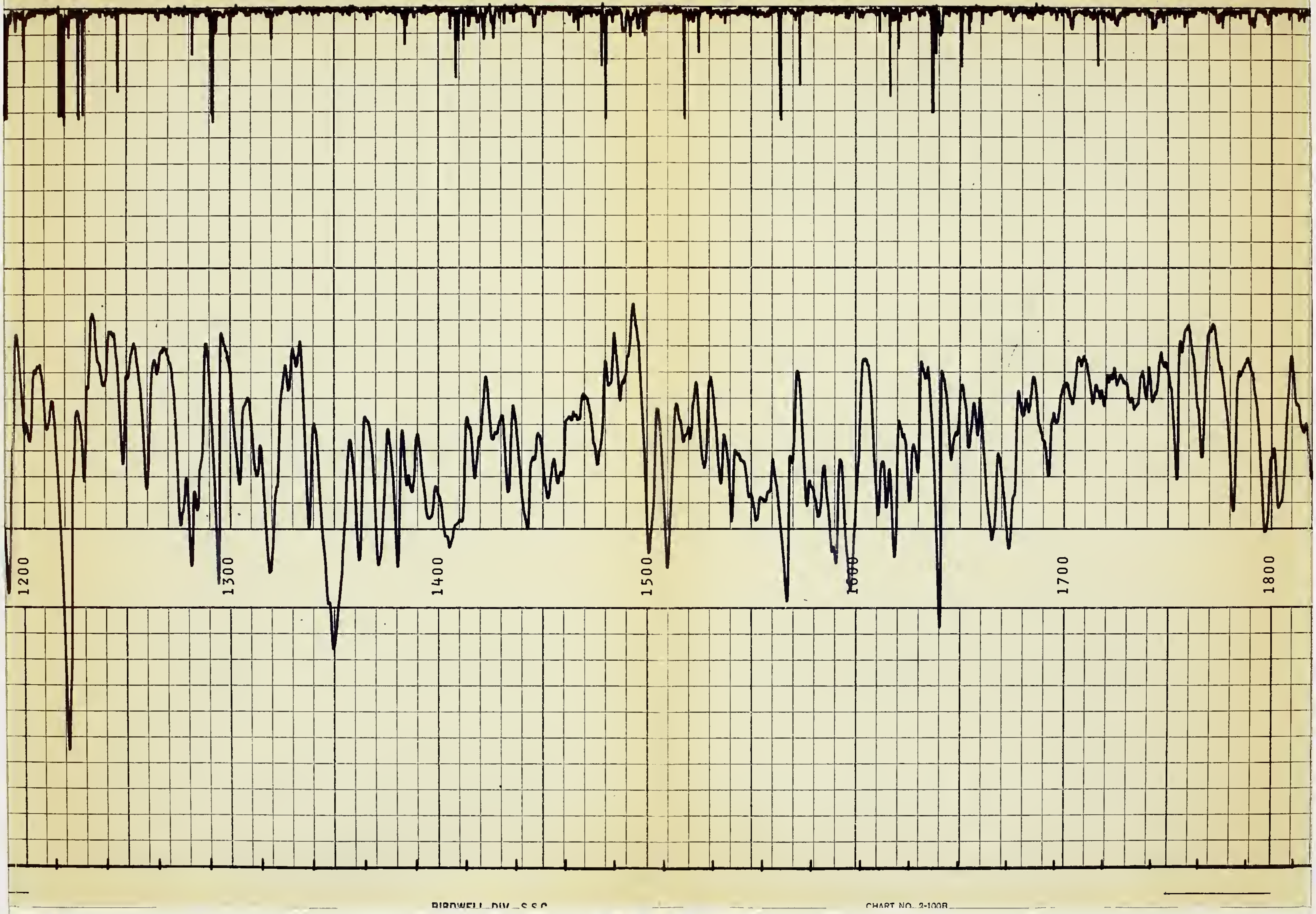
DIRECT COUNT RATE KCPM
2 0 2 5 3 0

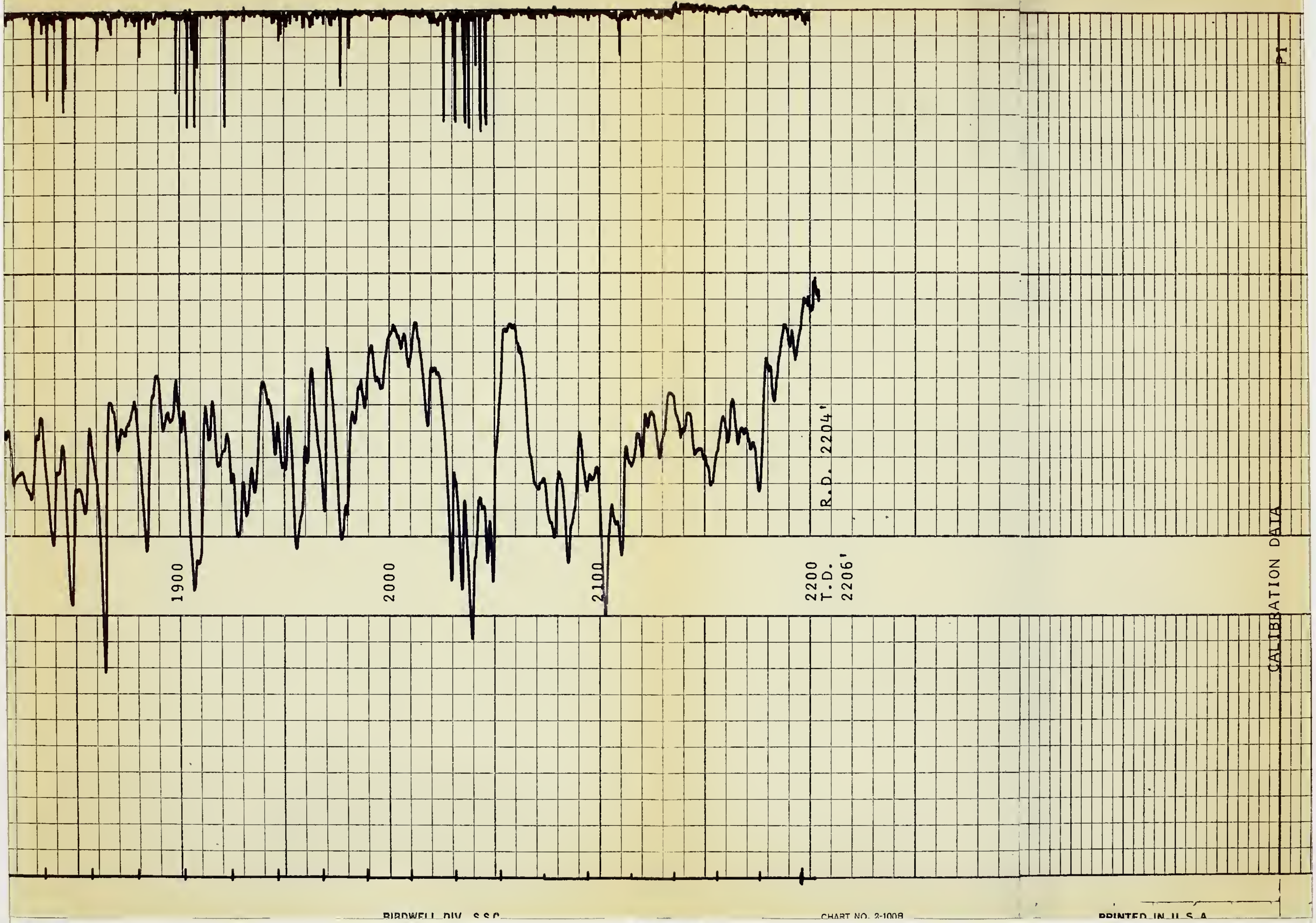


BIRDWELL DIV. S.S.C.

CHART NO. 2-100B


600
700
800
900
1000
1100
BIRDWELL DIV. S.S.C.
CHART NO. 2-100B


1200
1300
1400
1500
1600
1700
1800
BIRDWELL DIV. S.S.C.
CHART NO. 2-100B



1900
2000
2100
2200
T.D.
2206'
R.D. 2204'
CALIBRATION DATA
BIRDWELL DIV. S.S.C.
CHART NO. 2-1008
PRINTED IN U.S.A.

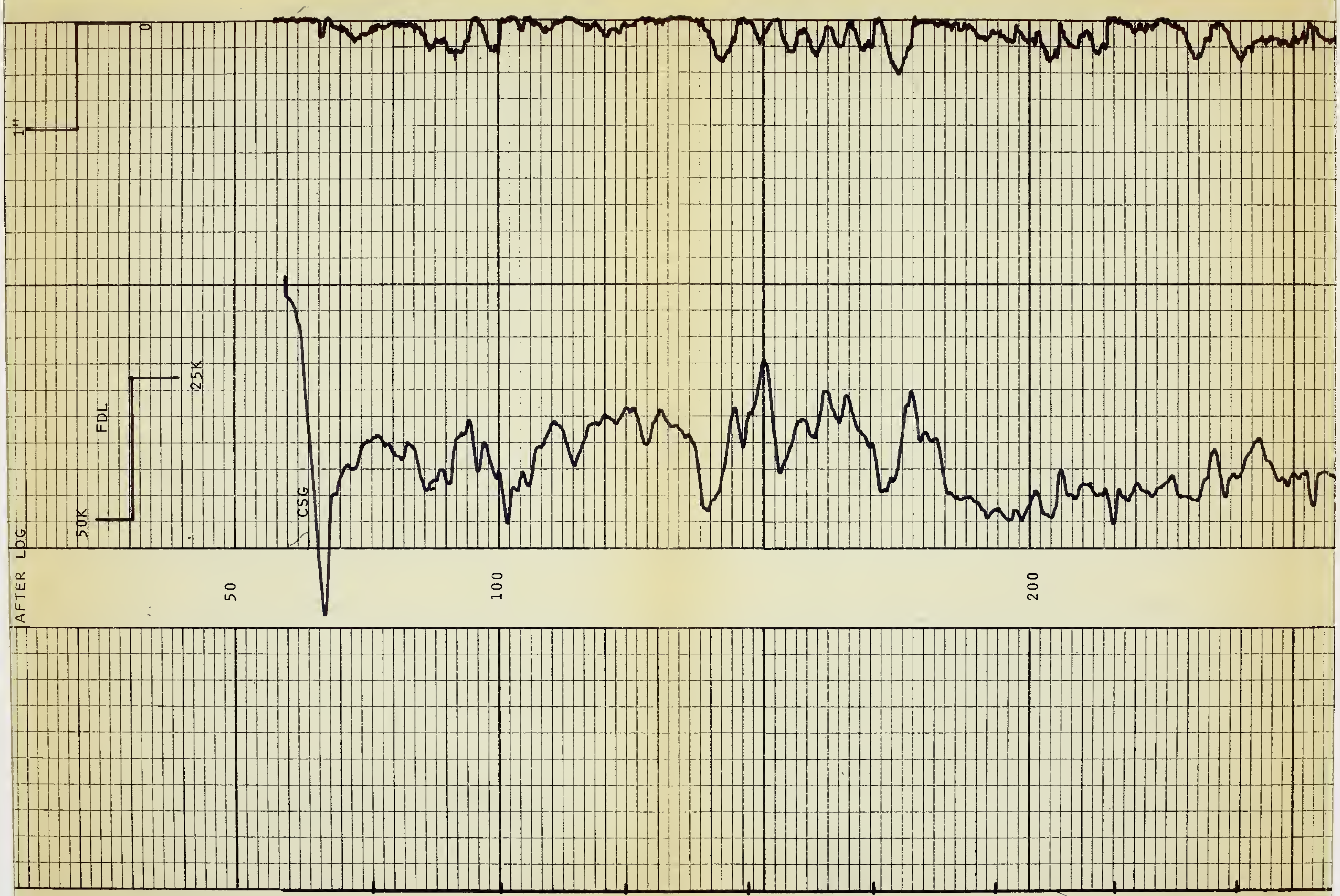
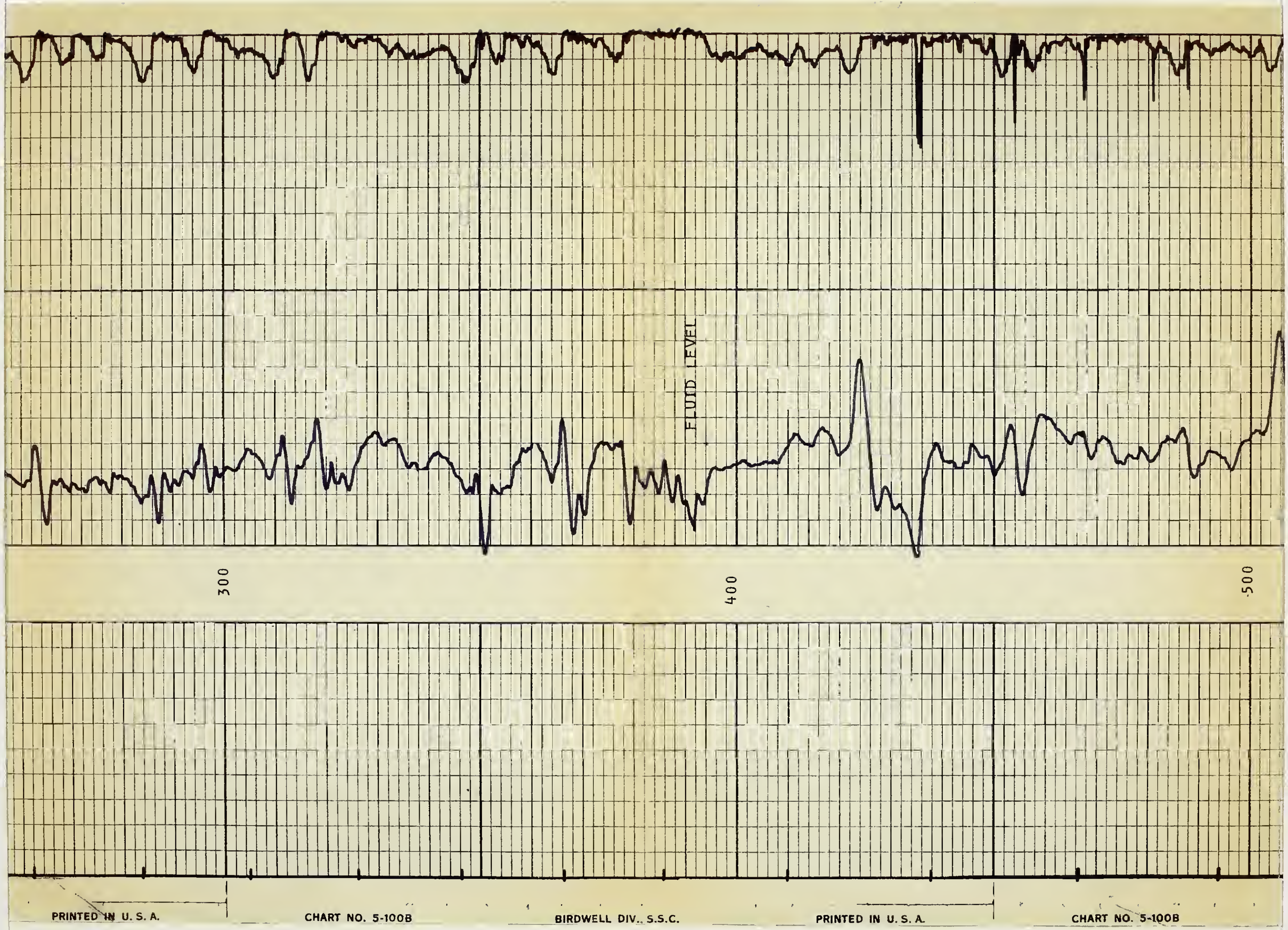
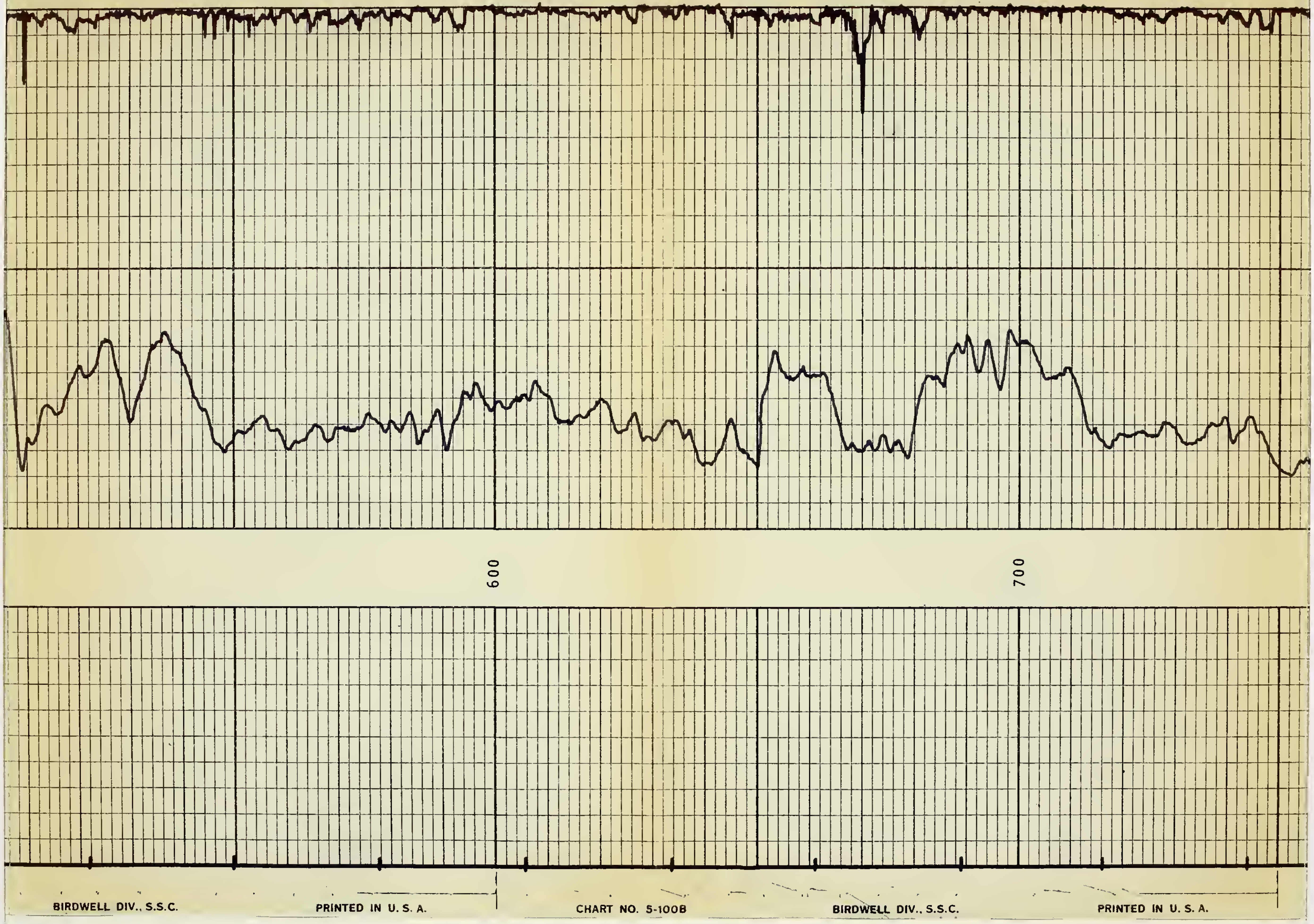
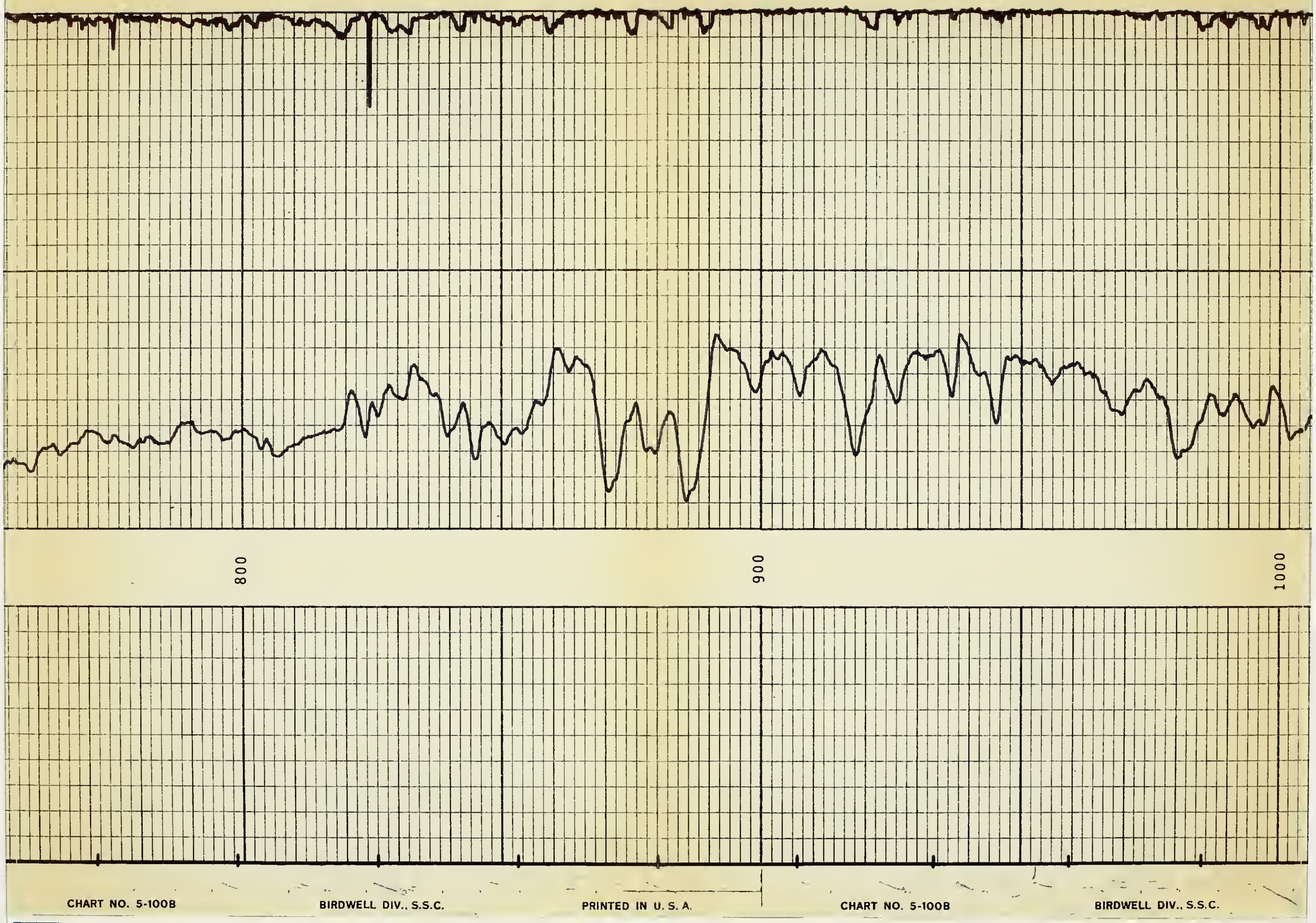
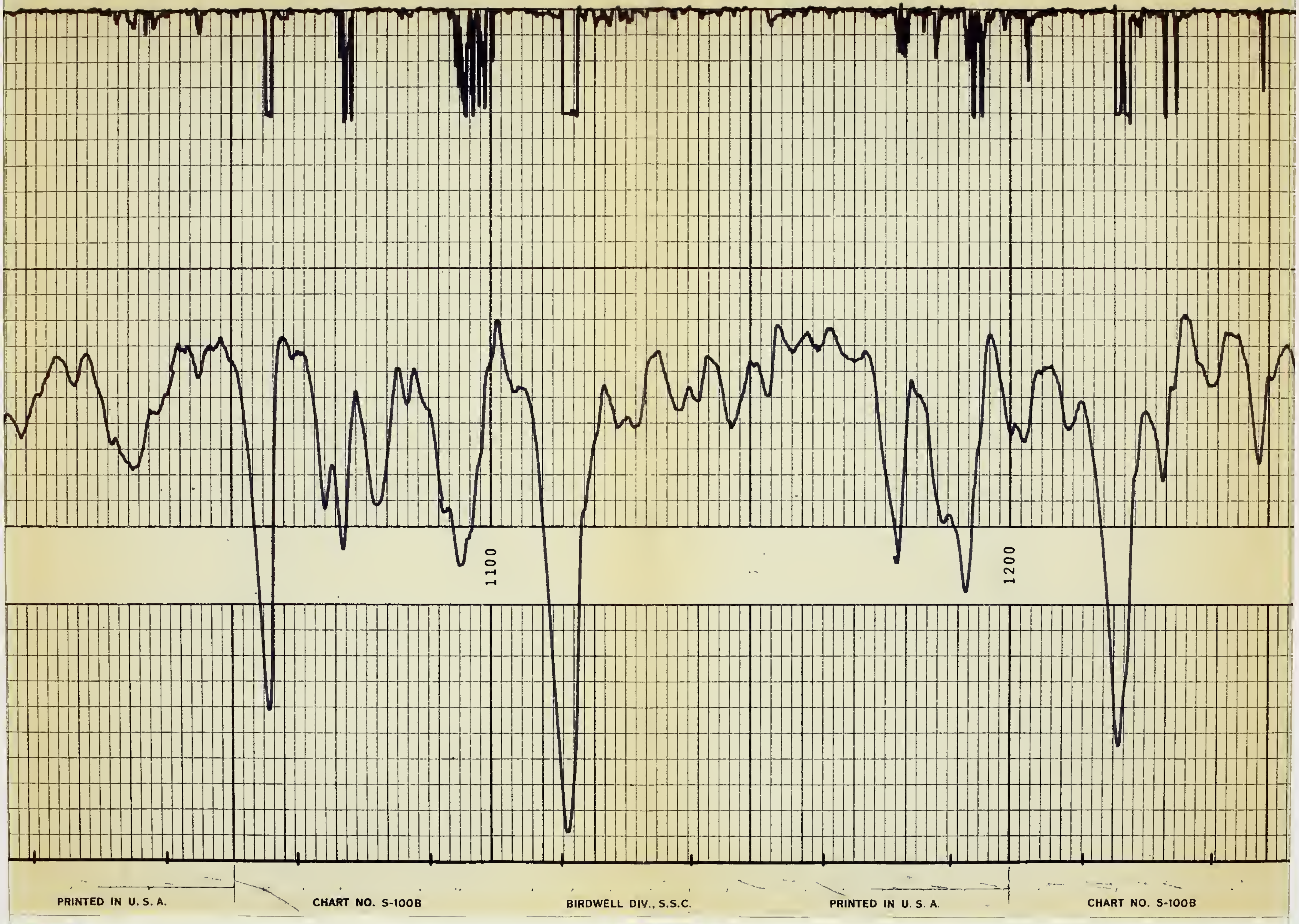


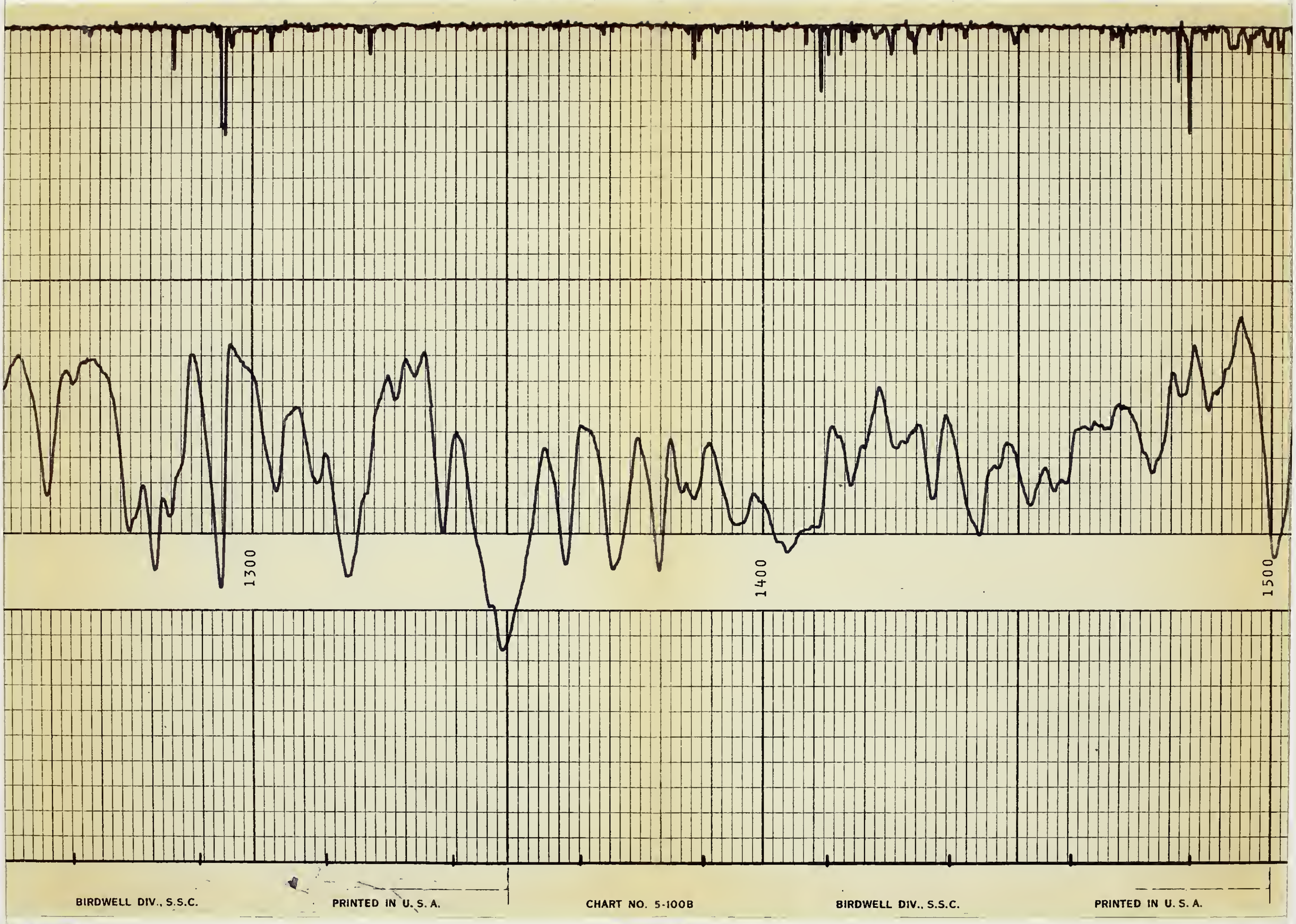
CHART NO. 5-1008 BIRDWELL DIV. S.S.C. PRINTED IN U.S.A. CHART NO. 5-1008 BIRDWELL DIV., S.S.C.

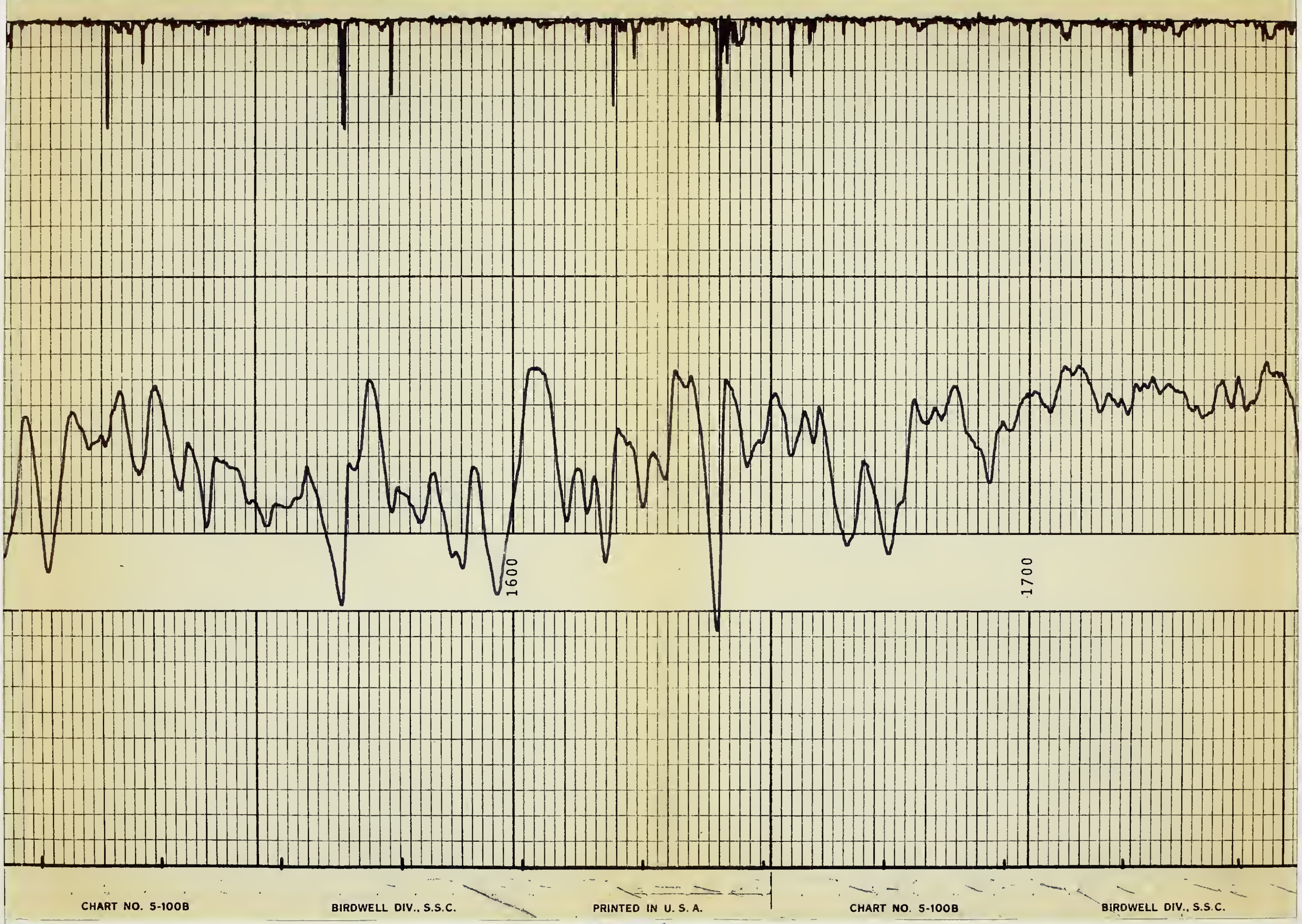

FLUID LEVEL
300
400
500
PRINTED IN U. S. A.
CHART NO. 5-100B
BIRDWELL DIV., S.S.C.
PRINTED IN U. S. A.
CHART NO. 5-100B

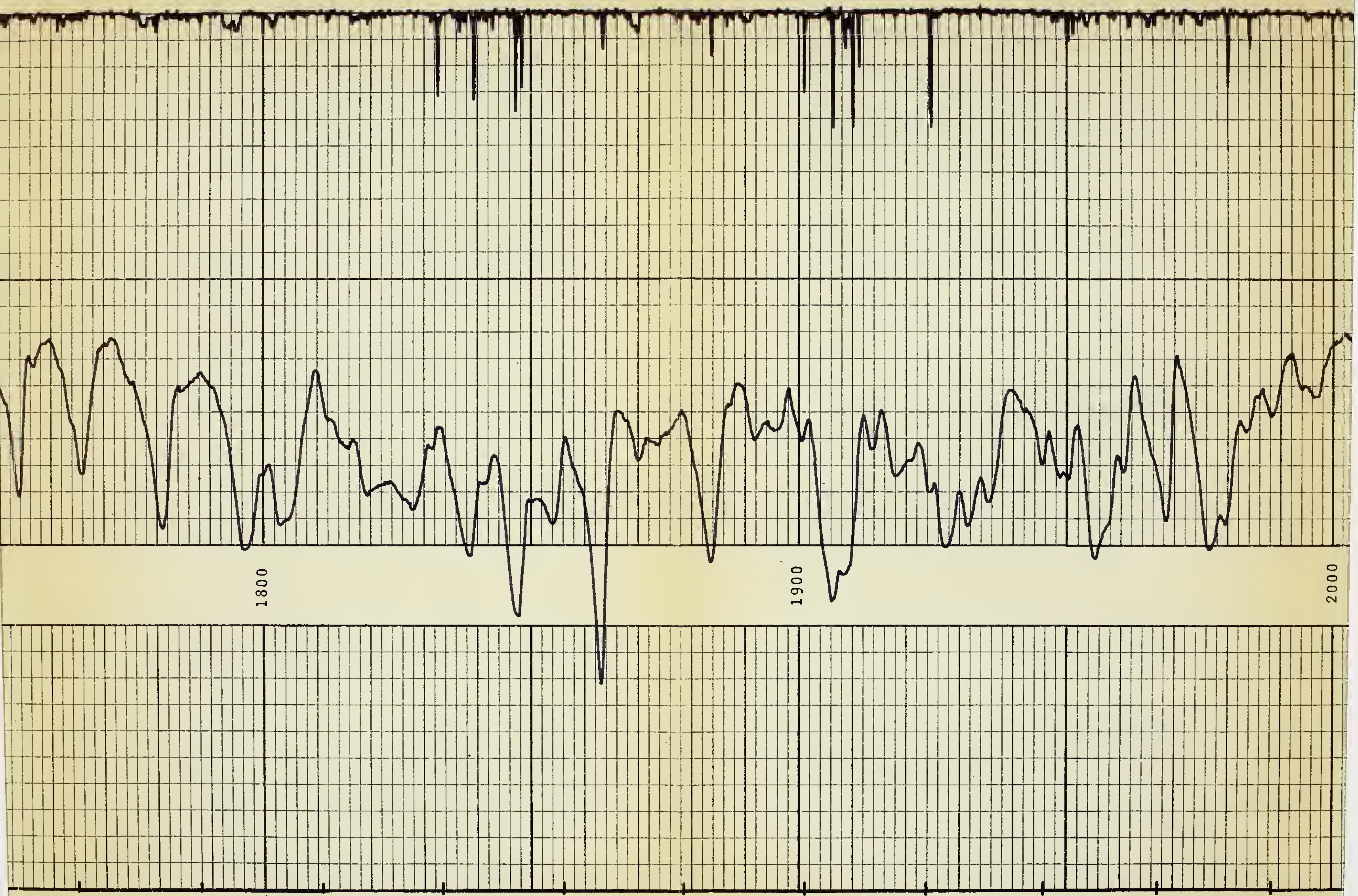

600
700
BIRDWELL DIV., S.S.C.
PRINTED IN U. S. A.
CHART NO. 5-100B
BIRDWELL DIV., S.S.C.
PRINTED IN U. S. A.


800
900
1000
CHART NO. 5-100B
BIRDWELL DIV., S.S.C.
PRINTED IN U. S. A.
CHART NO. 5-100B
BIRDWELL DIV., S.S.C.

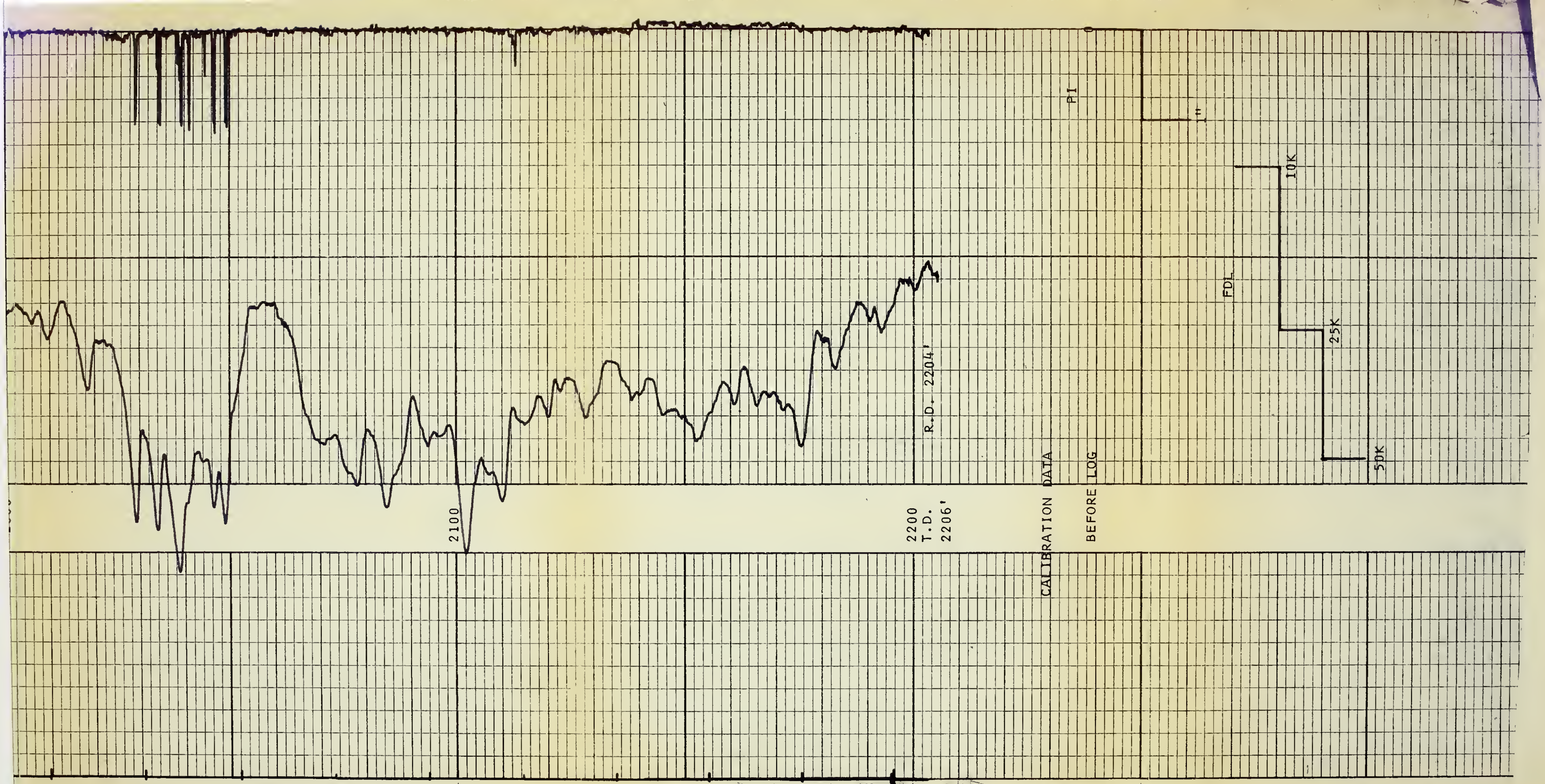

1100
1200
PRINTED IN U. S. A.
CHART NO. S-100B
BIRDWELL DIV., S.S.C.
PRINTED IN U. S. A.
CHART NO. S-100B


1300
1400
1500
BIRDWELL DIV., S.S.C.
PRINTED IN U. S. A.
CHART NO. 5-100B
BIRDWELL DIV., S.S.C.
PRINTED IN U. S. A.


1600
1700
CHART NO. 5-100B
BIRDWELL DIV., S.S.C.
PRINTED IN U. S. A.
CHART NO. 5-100B
BIRDWELL DIV., S.S.C.



PRINTED IN U. S. A. CHART NO. 5-100B BIRDWELL DIV., S.S.C. PRINTED IN U. S. A. CHART NO. 5-100B



BIRDWELL DIV., S.S.C. PRINTED IN U.S.A. CHART NO. 5-100B BIRDWELL DIV., S.S.C. PRINTED IN U.S.A. CHART NO. 5-100B BIRDWELL DIV.

Birdwell

Nuclear Log

COMPANY	ATLANTIC RICHFIELD COMPANY, ET. AL.
WELL	SORGHUM GULCH #H-10
FIELD	
COUNTY	RIO BLANCO
STATE	COLORADO

LOCATION:
97' FNL & 184' FEL

SEC. 13 TWP. 3S RGE. 97W

OTHER SERVICES
CAL FDL V3D
TL ES

ELEVATIONS:
KB.
DF.
GL. 6950'

PERMANENT DATUM GROUND LEVEL, ELEV. 6950'
LOG MEASURED FROM GL, ft. above perm. datum
DRILLING MEASURED FROM GL

DATE	29 JUNE 74		
RUN NO.		1	
TYPE LOG	GR	ENP	
DEPTH – DRILLER	2211	2211	
DEPTH – LOGGER	2206	2206	
BOTTOM LOGGED INTERVAL	2195	2206	
TOP LOGGED INTERVAL	20	20	
TYPE FLUID IN HOLE	WATER	WATER	
SALINITY PPM CL.		1	
DENSITY LB./GAL.			
LEVEL	394	394	
MAX. REC. TEMP. – DEG. F	98°	98°	
OPERATING RIG TIME	2 HOURS TOTAL TIME		
RECORDED BY	WILSON	WILSON	
WITNESSED BY	TAIT	TAIT	
LOCATION	LAS VEGAS	LAS VEGAS	

RUN NO.	BORE HOLE RECORD			CASING RECORD			
	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1				7"		0	62'
	5-5/8"	62'	1200'				
	4-7/8"	1200'	2211'				

SSC-606-F

THIS HEADING AND LOG CONFORM TO API RP-33 ®

EQUIPMENT DATA

GAMMA RAY

RUN NO.	1
TOOL MODEL NO.	LAAB
DIAMETER	3-5/8"
DETECT. MODEL NO.	MG-70 HIT
TYPE	GM
LENGTH	12"
DIST. TO N. SOURCE	9'

GENERAL

TRUCK NO.	2694
TOOL SERIAL NO.	

NEUTRON

RUN NO.	1
LOG TYPE	ENP
TOOL MODEL NO.	LABB
DIAMETER	3-5/8"
DETECT. MODEL NO.	9373 TN
TYPE	GM
LENGTH	6"
SOURCE MODEL NO.	MRC
SERIAL NO.	289
SPACING	15.5"
TYPE	PU:8BE
STRENGTH-N/SEC.	

LOGGING DATA

GENERAL				GAMMA RAY				NEUTRON			
RUN NO.	DEPTHS FROM	DEPTHS TO	SPEED FT/MIN	T.C. SEC.	CPM FULL SCALE	ZERO DIV. L OR R	API G.R. UNITS PER LOG DIV.	T.C. SEC.	CPM FULL SCALE	ZERO DIV. L OR R	N. UNITS PER LOG DIV.
1	2195	20	20	3	$20X10^3$	0	20				
	2204	20						3	$50X10^3$		3%/DIV.

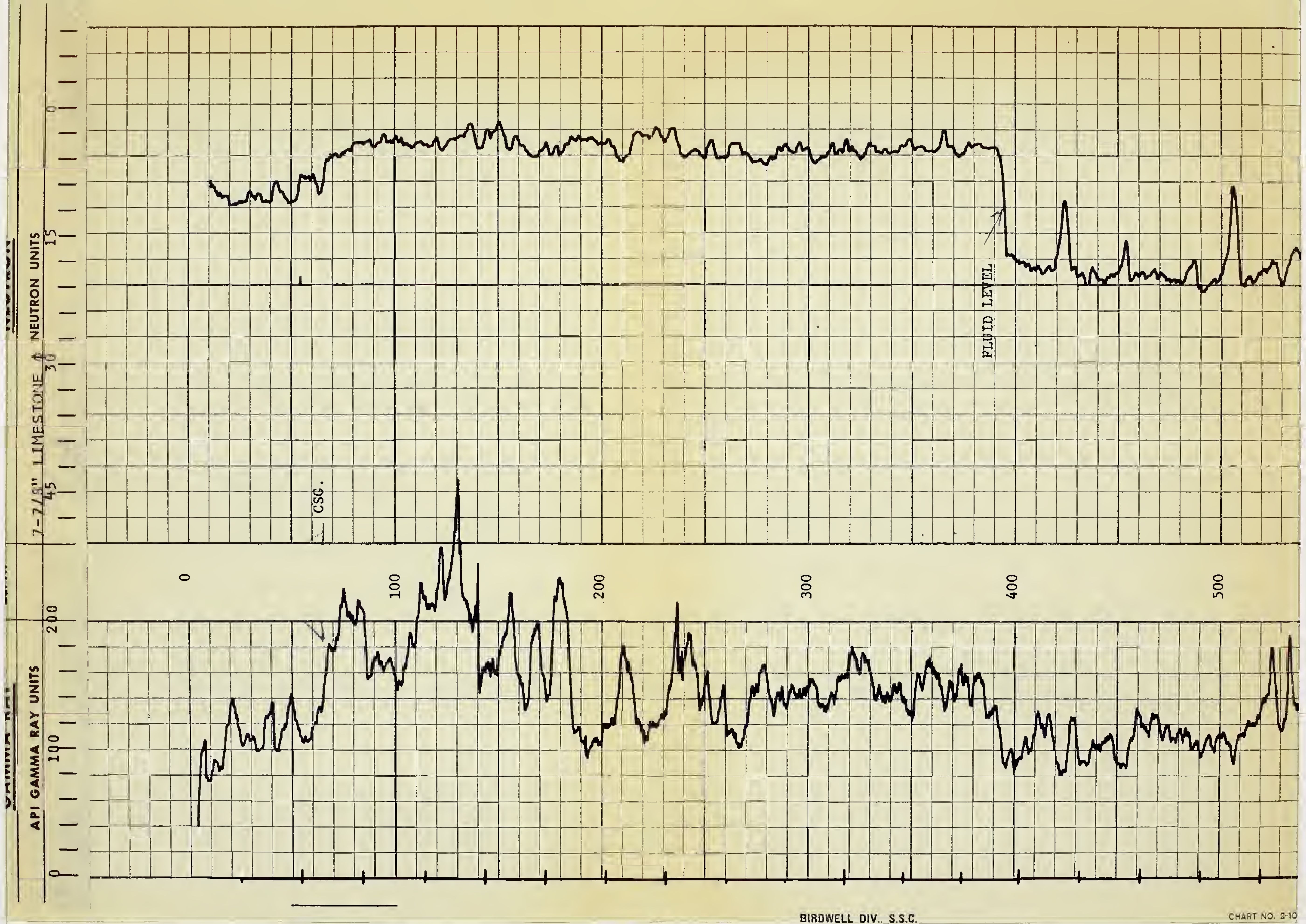
REFERENCE LITERATURE:

REMARKS: THIS WORK WAS PERFORMED UNDER UNITED STATES ATOMIC ENERGY COMMISSION BY-PRODUCT MATERIAL LICENSE NO. 35-05651-01 AND SPECIAL NUCLEAR MATERIALS LICENSE NO. SNM-161

GAMMA RAY

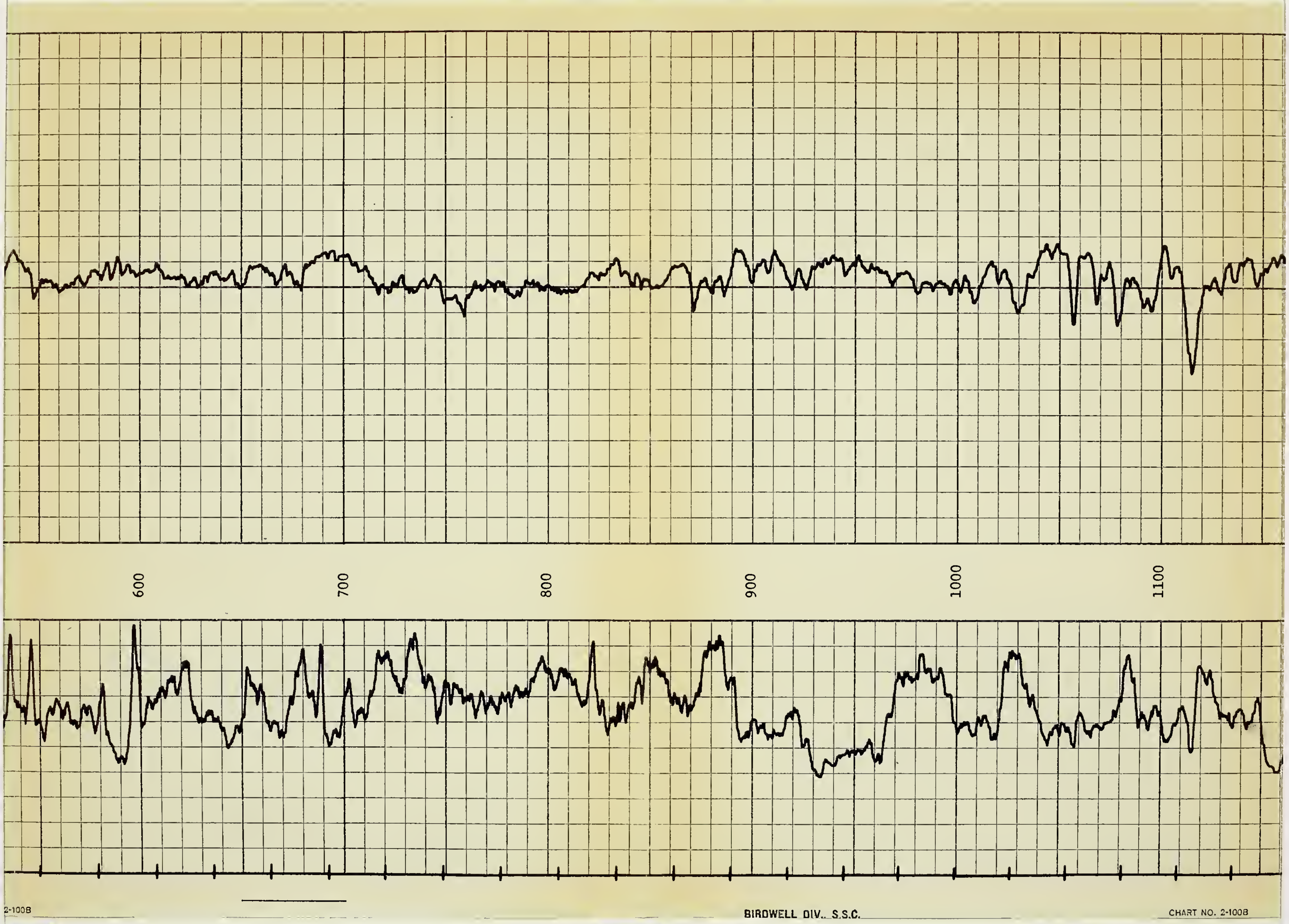
DEPTH

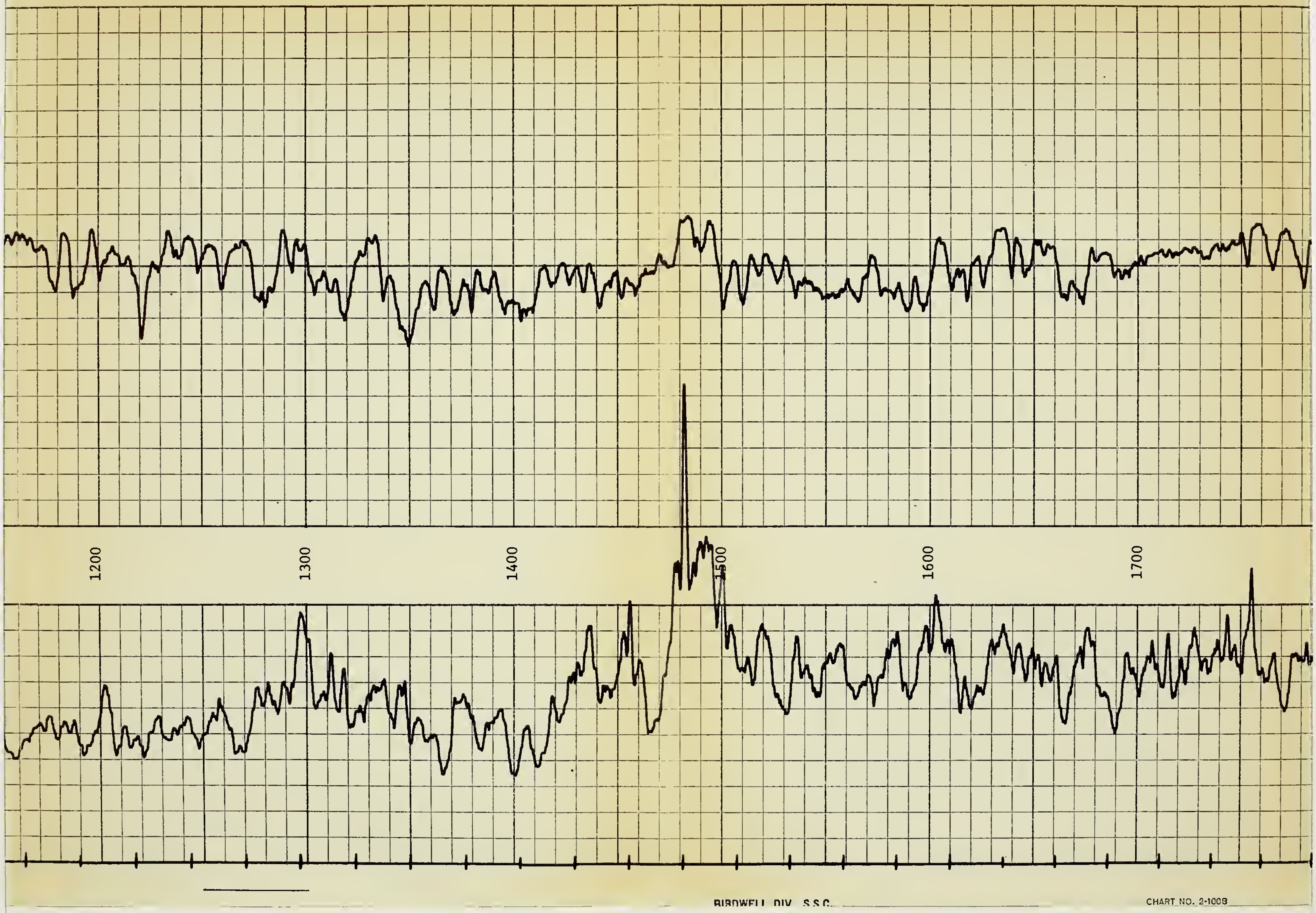
NEUTRON

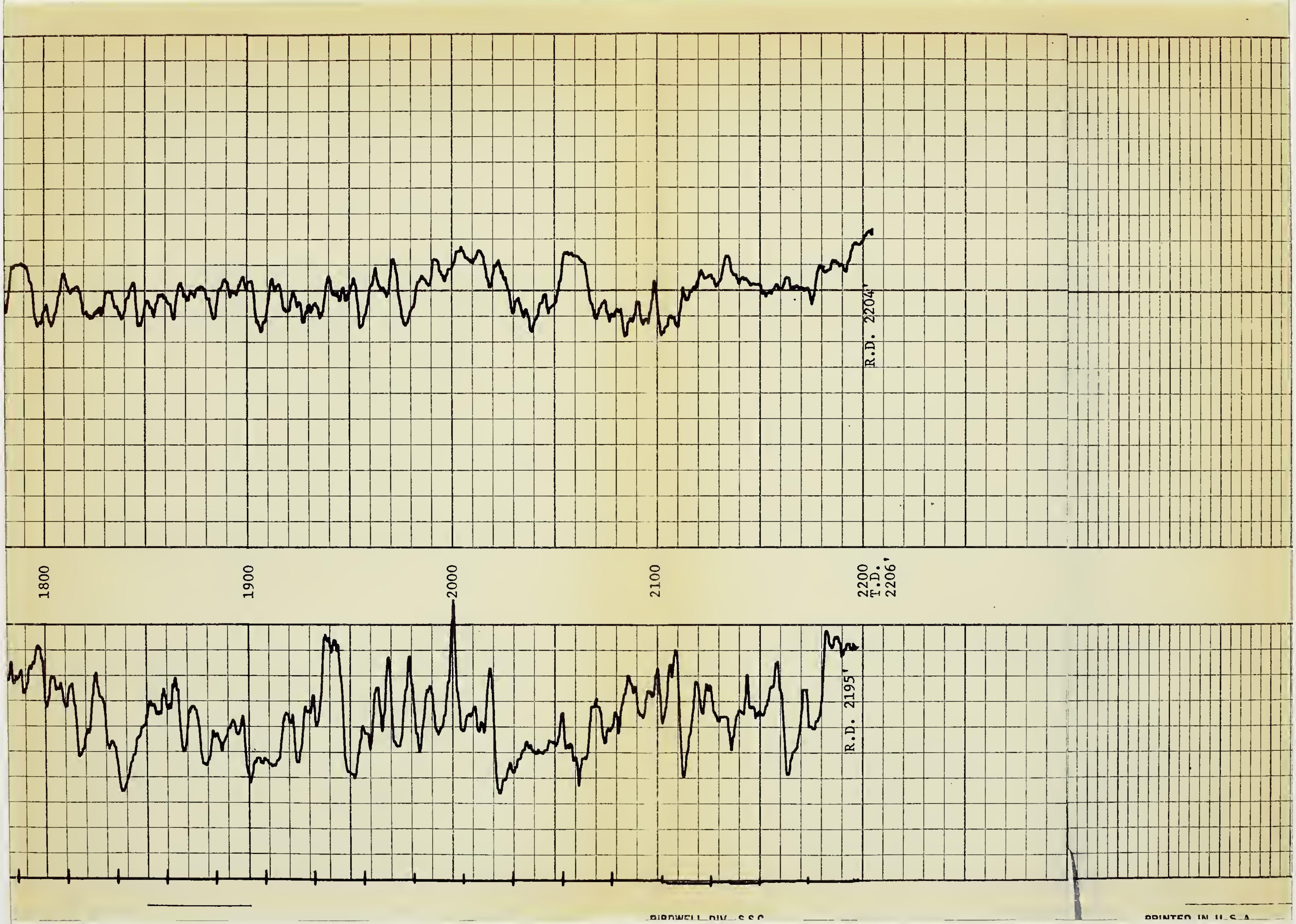


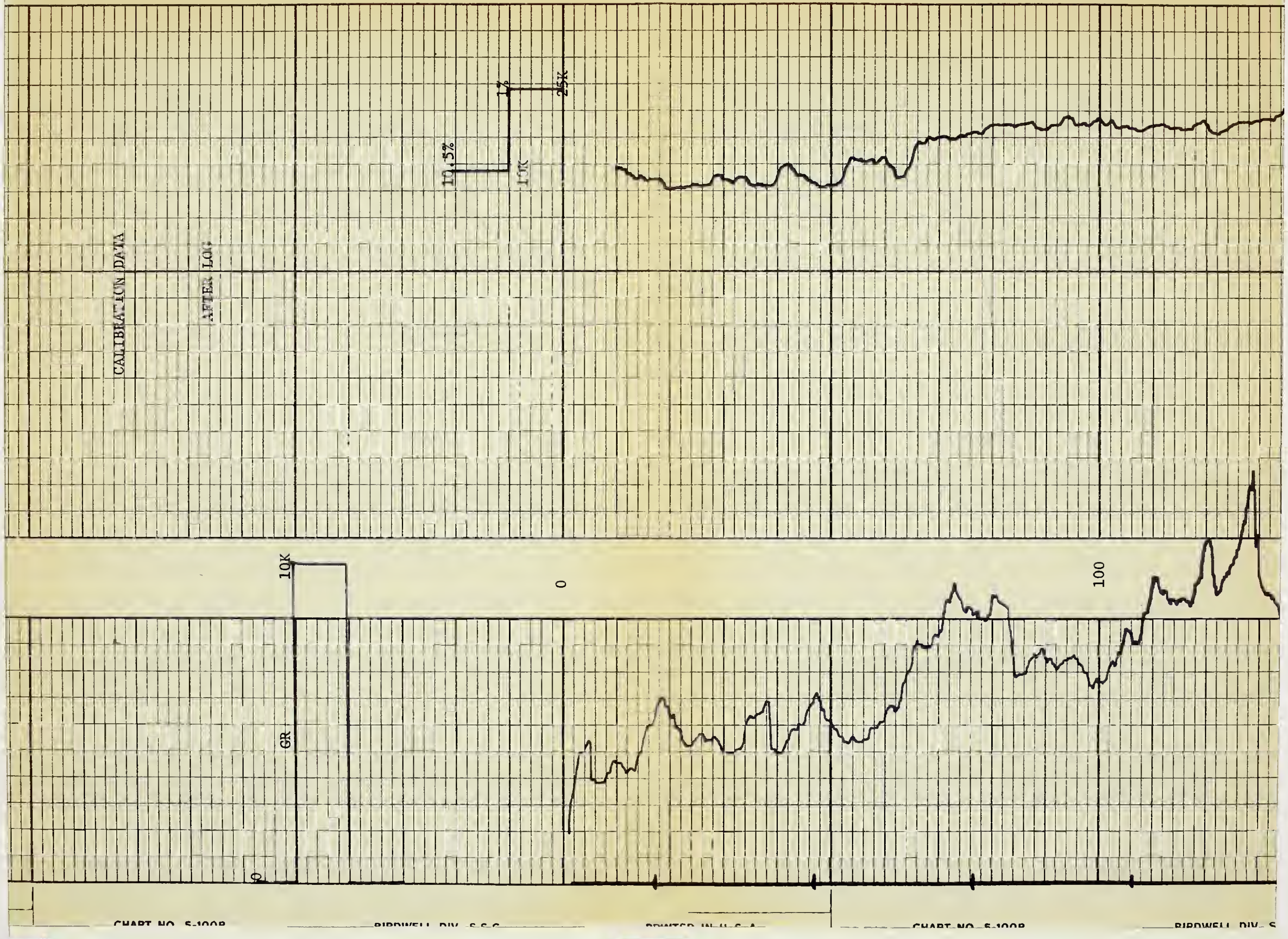
BIRDWELL DIV., S.S.C.

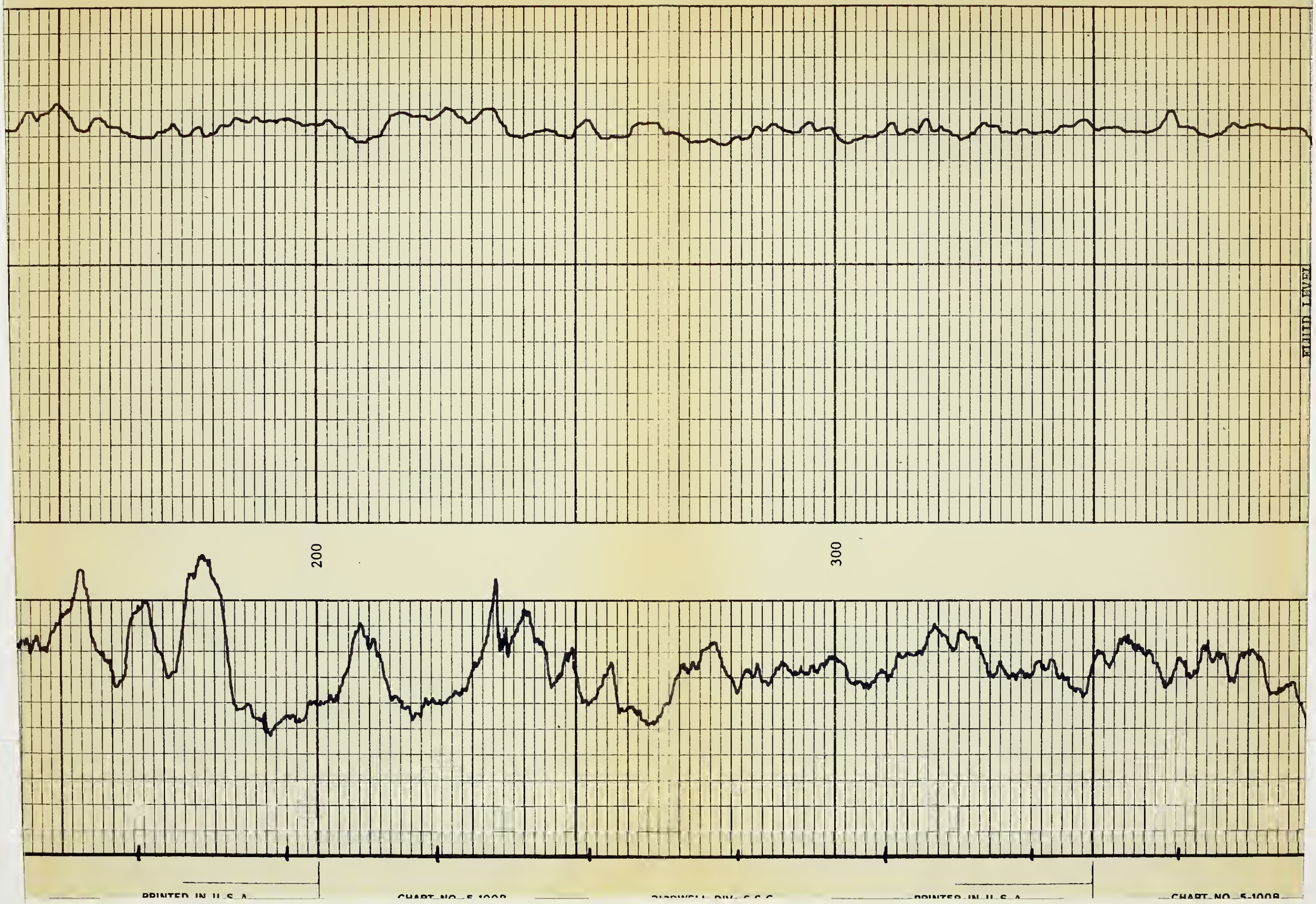
CHART NO. 2-10

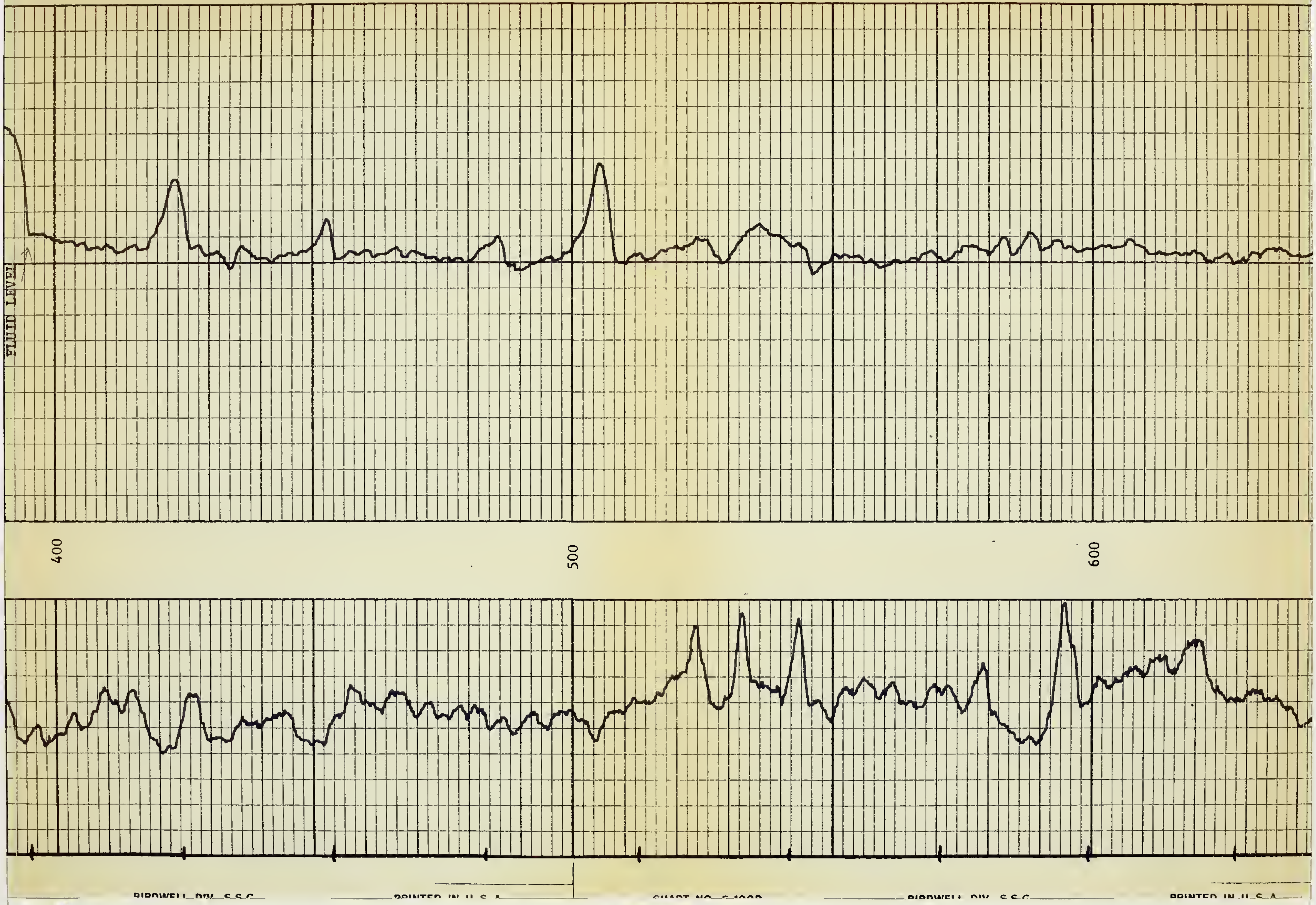

600
700
800
900
1000
1100
2-100B
BIRDWELL DIV., S.S.C.
CHART NO. 2-100B

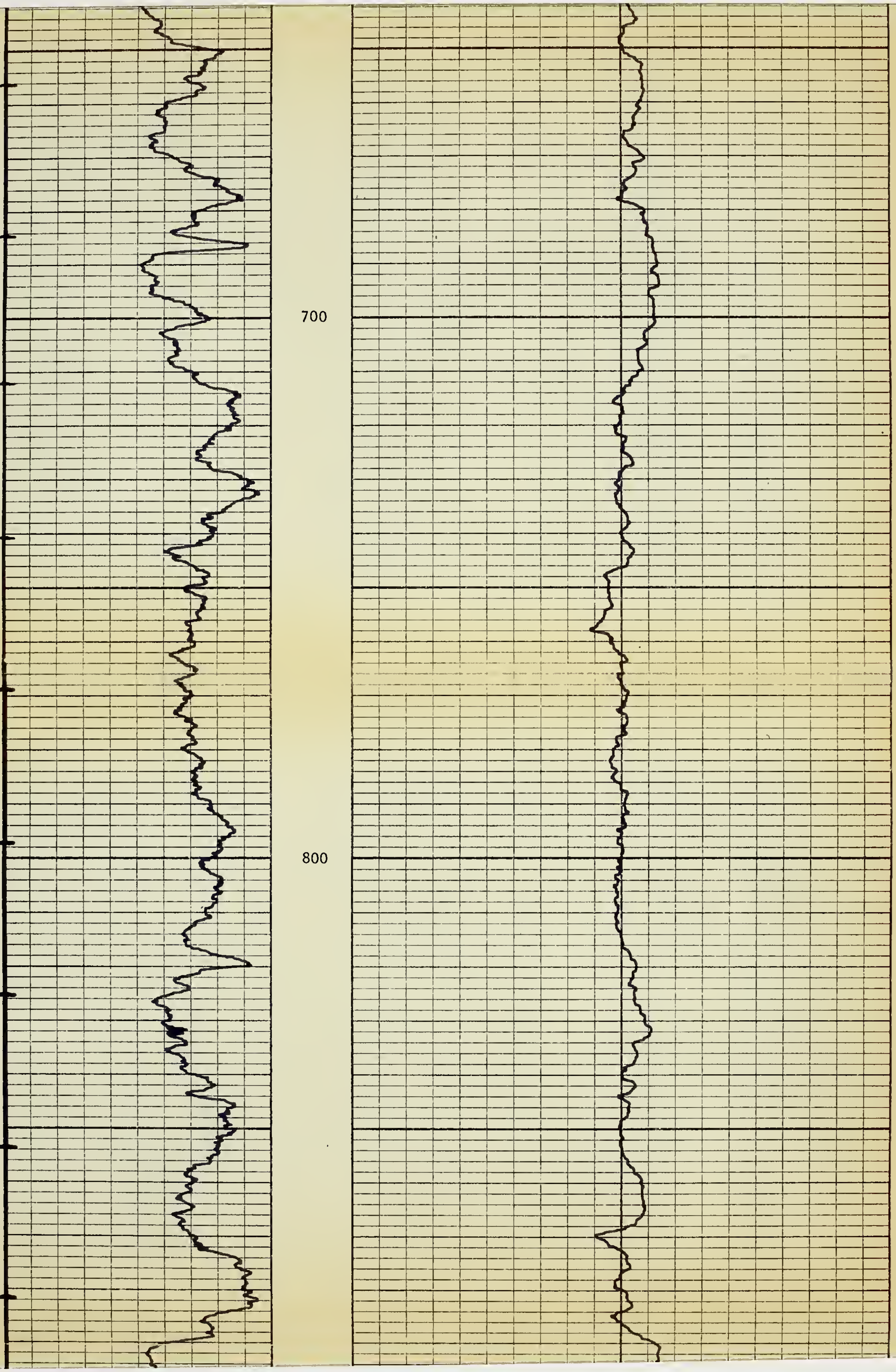

1200
1300
1400
1500
1600
1700
BIRDWELL DIV. S.S.C.
CHART NO. 2-1008

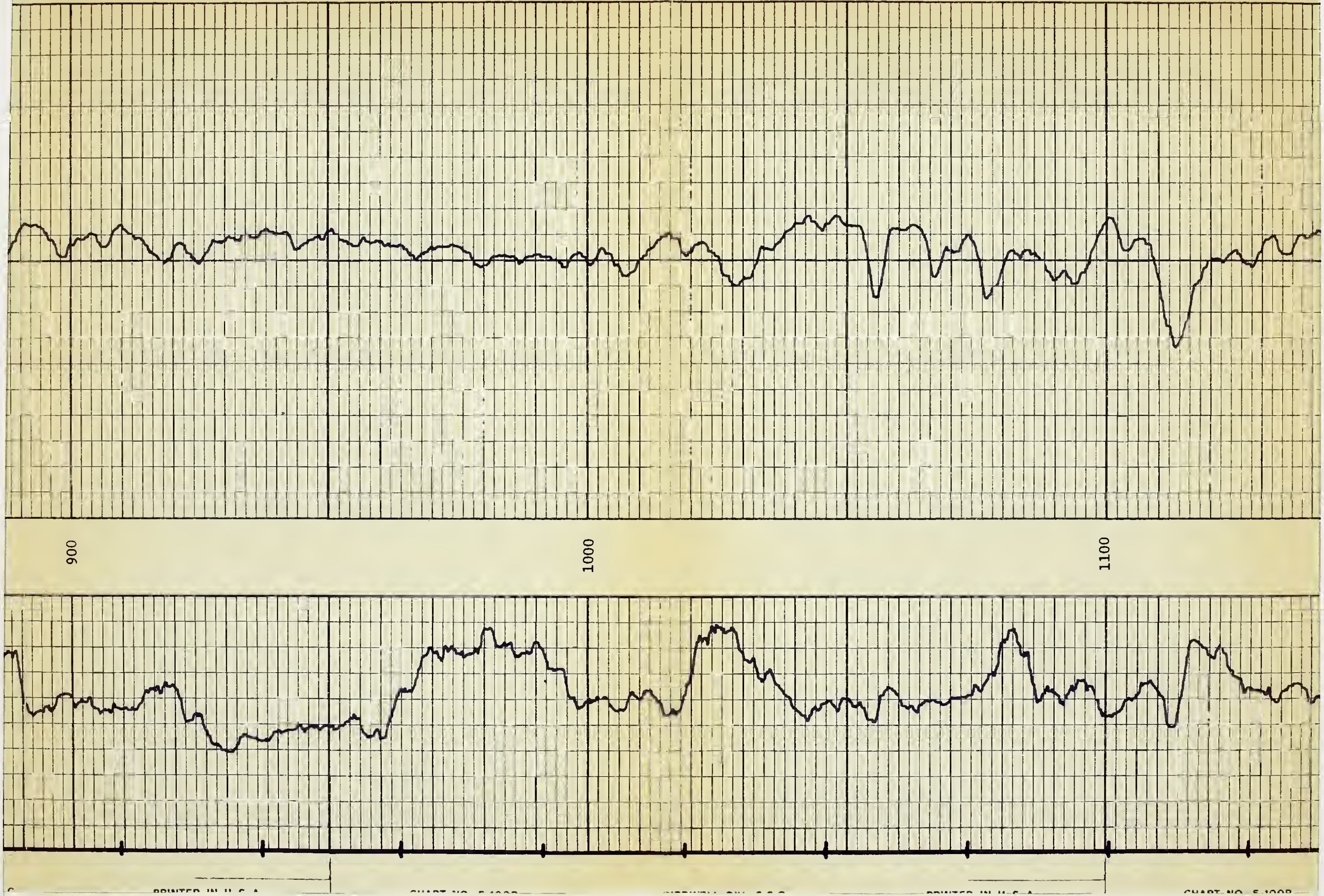

R.D. 2204'
1800
1900
2000
2100
2200
T.D.
2206'
R.D. 2195'
BIRDWELL DIV. S.S.C.
PRINTED IN U.S.A.

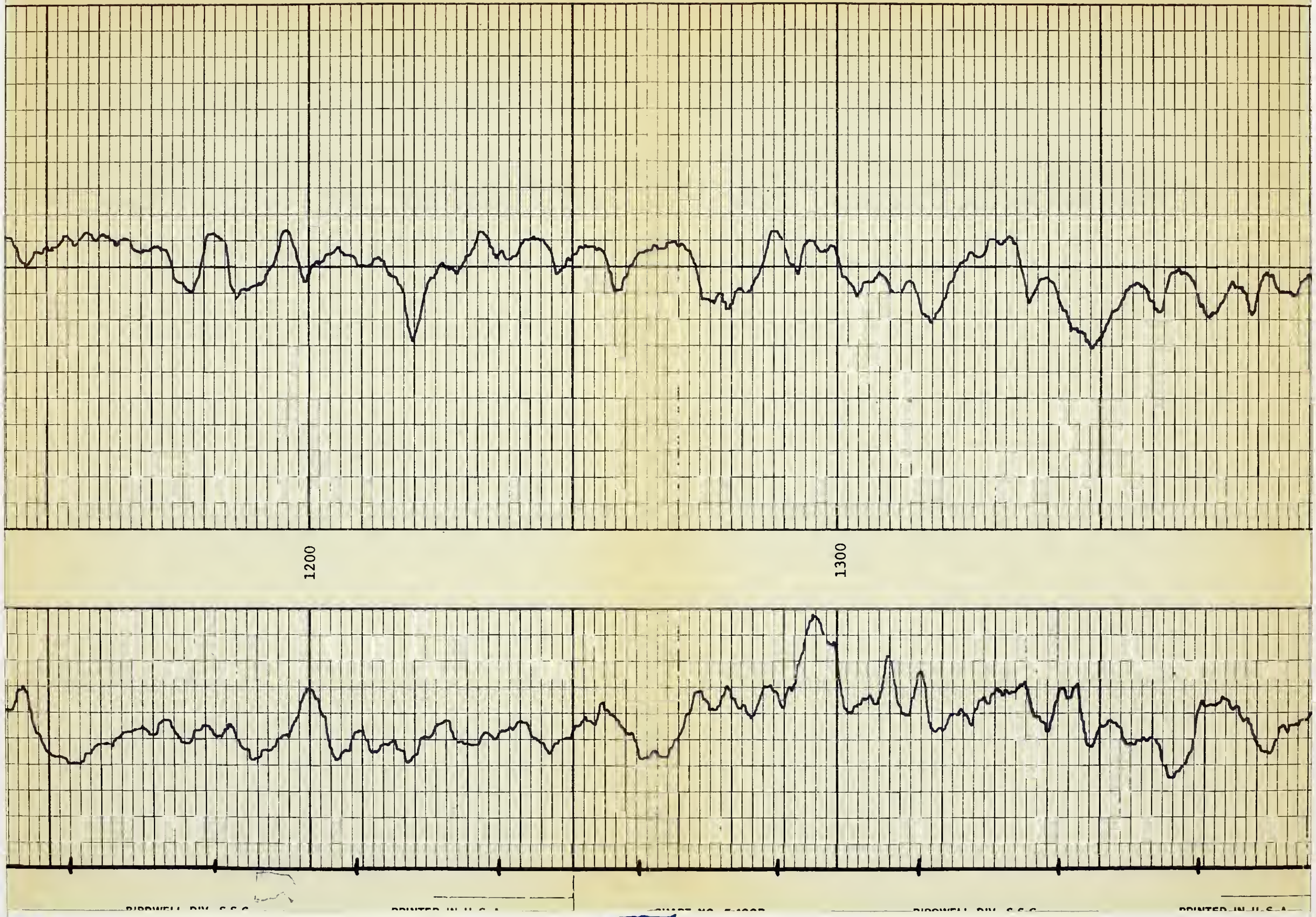

CALIBRATION DATA
AFTER LOG
10.5%
10K
1%
25K
10K
0
100
GR
0
CHART NO. S-100B
BIRDWELL DIV. S.S.C.
PRINTED IN U.S.A.
CHART NO. S-100B
BIRDWELL DIV. S

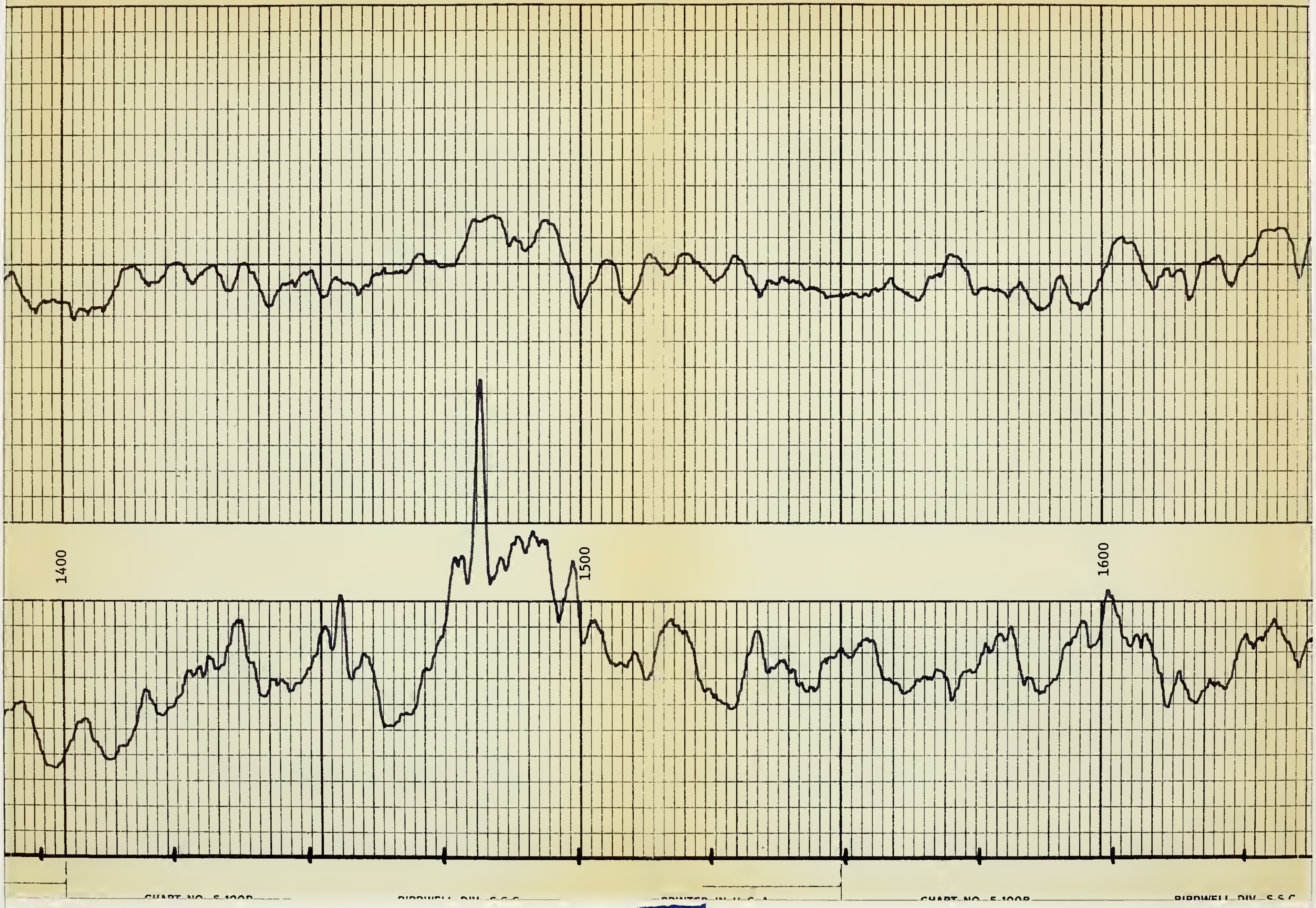

FLUID LEVEL
200
300
PRINTED IN U.S.A.
CHART NO. 5-100B
PRINTED IN U.S.A.
CHART NO. 5-100B

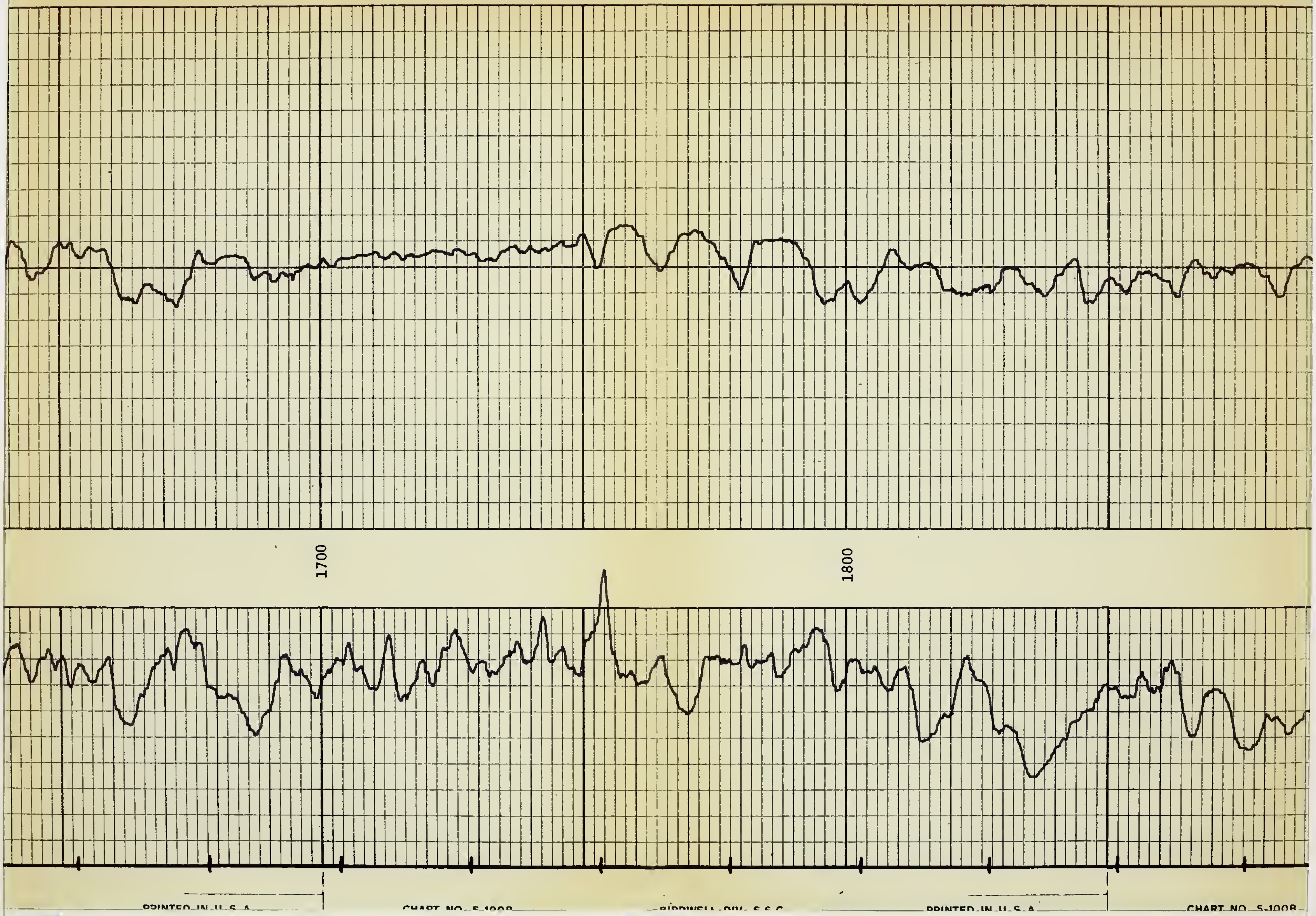

FLUID LEVEL
400
500
600
BIRDWELL DIV. S.S.C.
PRINTED IN U.S.A.
CHART NO. 5-100B
BIRDWELL DIV. S.S.C.
PRINTED IN U.S.A.

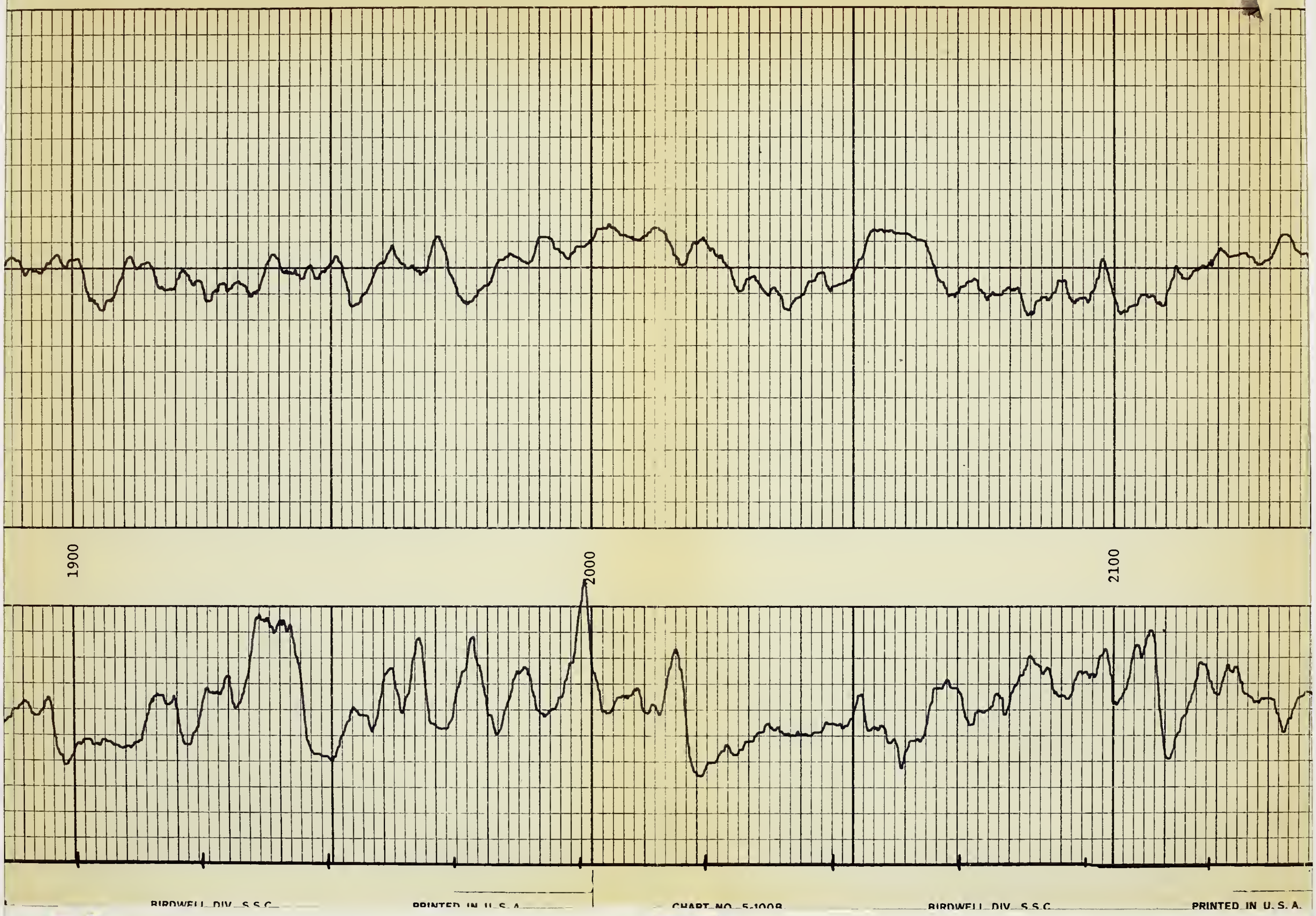

700
800

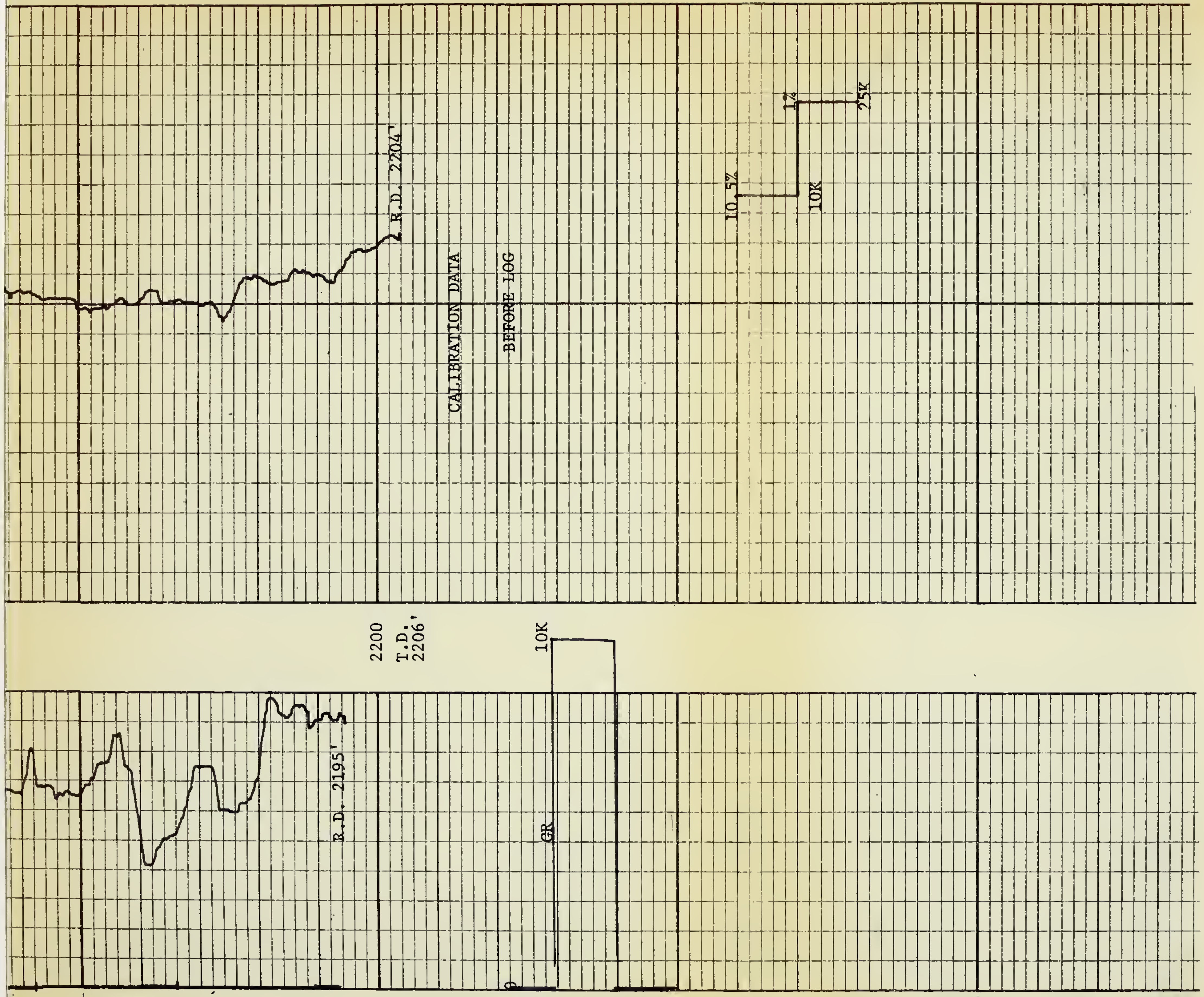

900
1000
1100


1200
1300
BIRDWELL DIV. S.S.C.
PRINTED IN U.S.A.
BIRDWELL DIV. S.S.C.
PRINTED IN U.S.A.


1400
1500
1600


1700
1800
PRINTED IN U.S.A.
CHART NO. S-100B
BIRDWELL DIV. S.S.C.
PRINTED IN U.S.A.
CHART NO. S-100B


1900
2000
2100
BIRDWELL DIV. S.S.C.
PRINTED IN U.S.A.
CHART NO. 5-1008
BIRDWELL DIV. S.S.C.
PRINTED IN U.S.A.


R.D. 2204'
CALIBRATION DATA
BEFORE LOG
10.5%
10K
1%
25K
2200
T.D. 2206'
10K
R.D. 2195'
GR
0

Birdwell

Caliper Log

FILING NO.

COMPANY ATLANTIC RICHFIELD COMPANY, ET. AL.

WELL SORGHUM GULCH #H-10

FIELD

COUNTY RIO BLANCO STATE COLORADO

LOCATION: 97' FNL & 184' FEL

OTHER SERVICES:

SEC. 13 TWP. 3S RGE. 97W

ELEVATIONS:
KB.
DF.
GL. 6950'

PERMANENT DATUM GROUND LEVEL ELEV. 6950'
LOG MEASURED FROM GL
DRILLING MEASURED FROM GL

DATE	29 JUNE 74		
RUN NO.			
TYPE LOG	CAL		
DEPTH—DRILLER	2211		
DEPTH—LOGGER	2206		
BOTTOM LOGGED INTERVAL	2204		
TOP LOGGED INTERVAL	20		
TYPE FLUID IN HOLE	WATER		
SALINITY PPM CL.			
DENSITY LB./GAL.			
LEVEL	394		
MAX. REC. TEMP.—DEG. F.	98°		
OPR. RIG TIME	1 HR.		
RECORDED BY	WILSON		
WITNESSED BY	TAIT		
LOCATION	LAS VEGAS		

RUN NO.	BORE HOLE RECORD			CASING RECORD			
	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1				7"		0	62'
	5-5/8"	62'	1200'				
	4-7/8"	1200'	2211'				

SSC-607-D

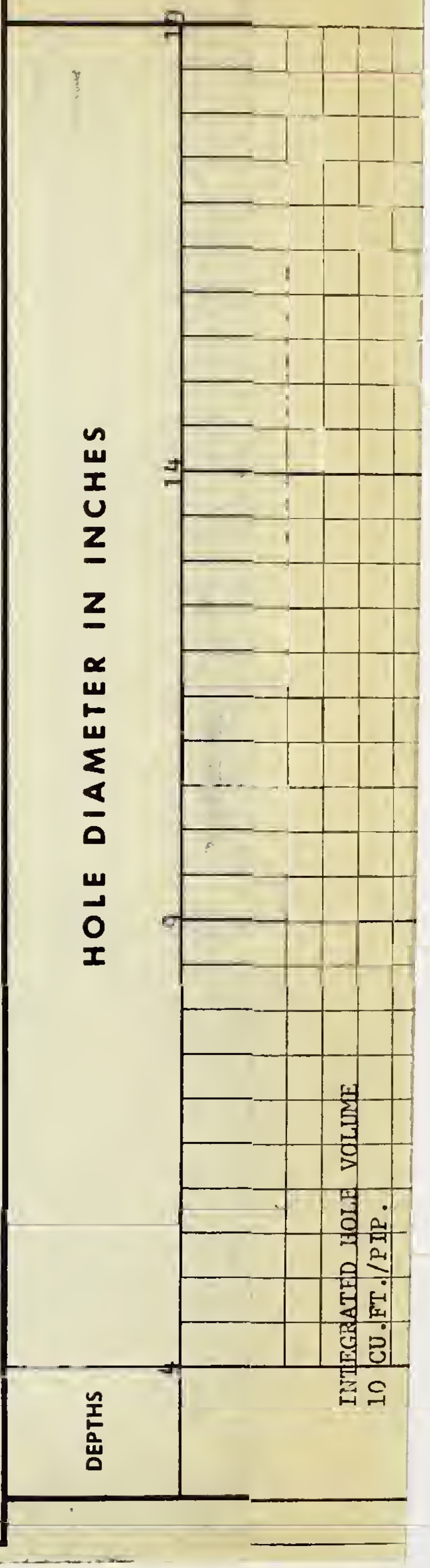
WELL DATA

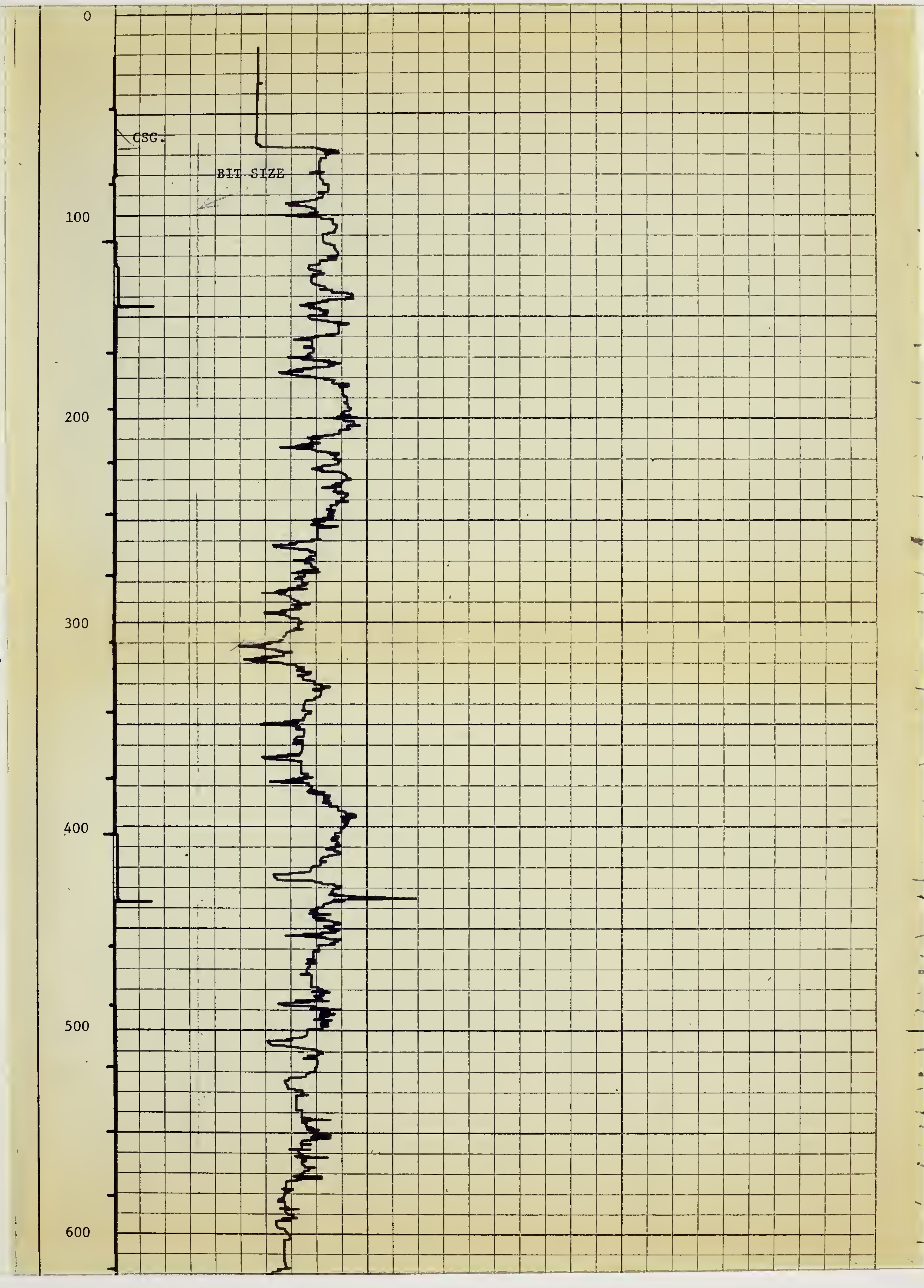
P.B.T.D.	
ORIGINAL TOTAL DEPTH	
TYPE WELL	
OPEN HOLE SHOT WITH	
AMOUNT	FM. TO
AMOUNT	FM. TO
AMOUNT	FM. TO
SPECIAL WELL CONDITIONS:	
PURPOSE OF SURVEY	

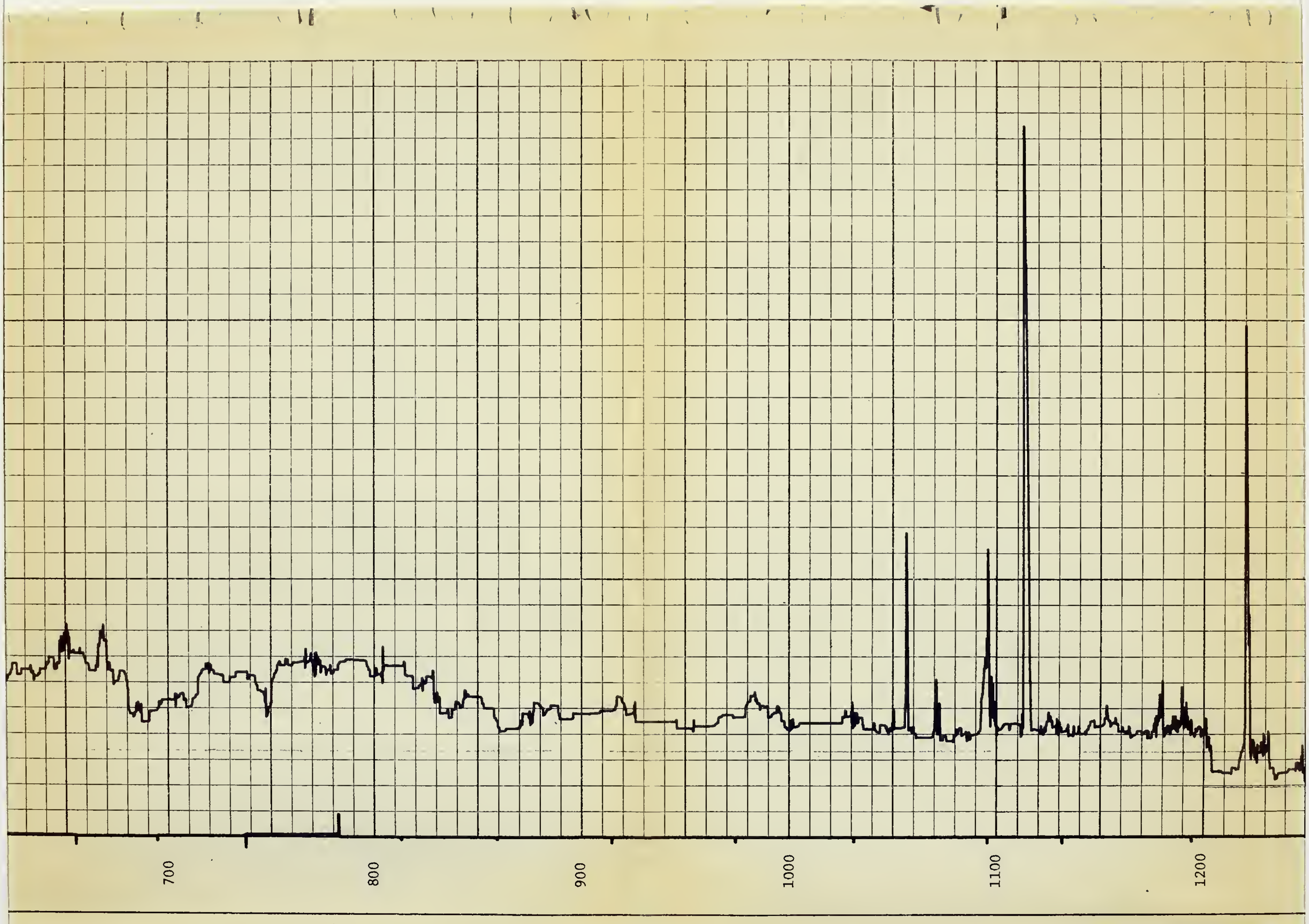
EQUIPMENT DATA

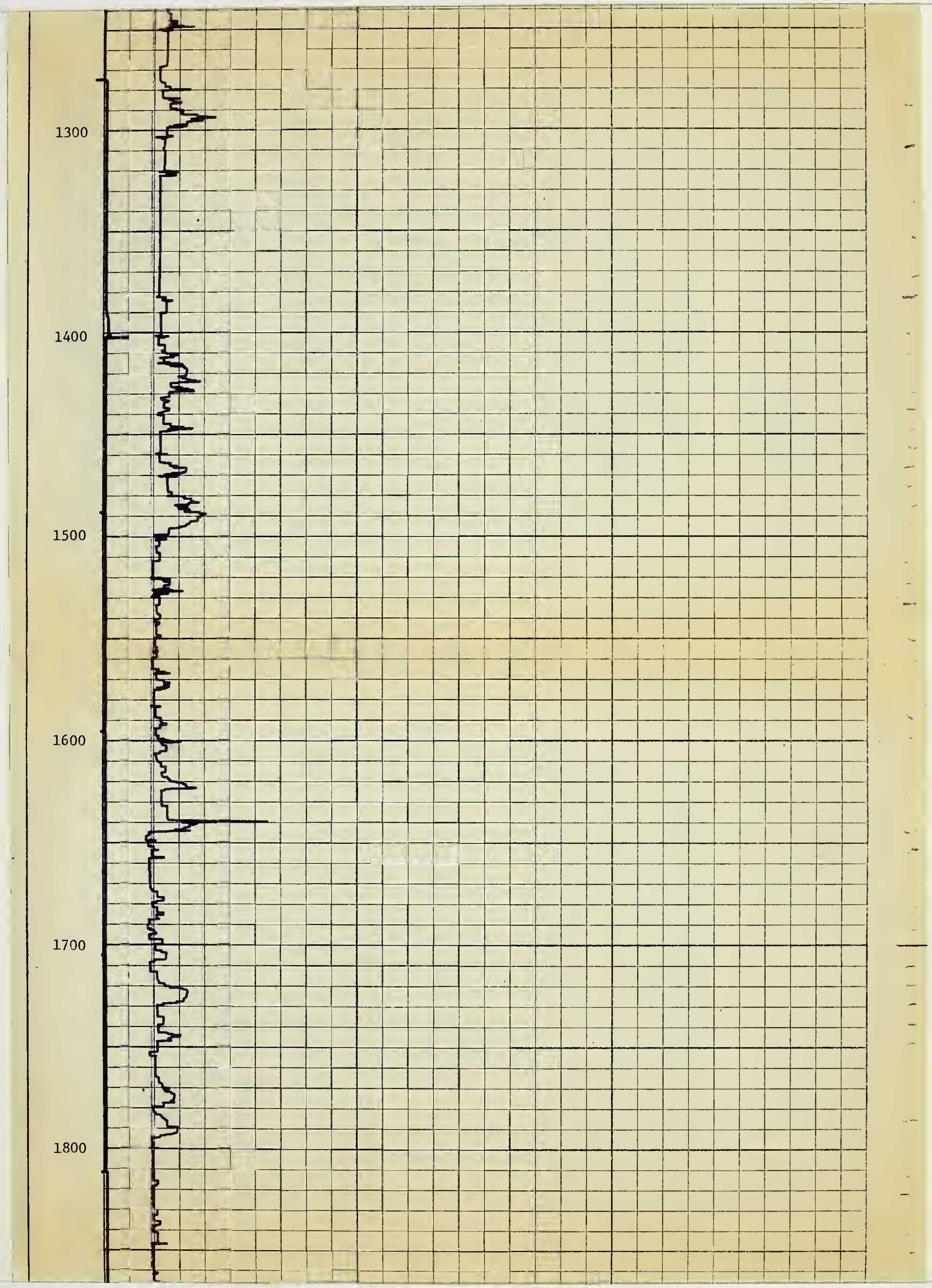
TYPE LOG	CALIPER
TOOL MODEL	LEBB
TOOL SERIAL NO.	
TOOL DIAMETER	3-5/8"
SPEED FT./MIN.	40
SCALE	1/2"/DIV.
MIN. ARM DIAM.	3-5/8"
MAX. ARM DIAM.	34"
TRUCK NO.	2694

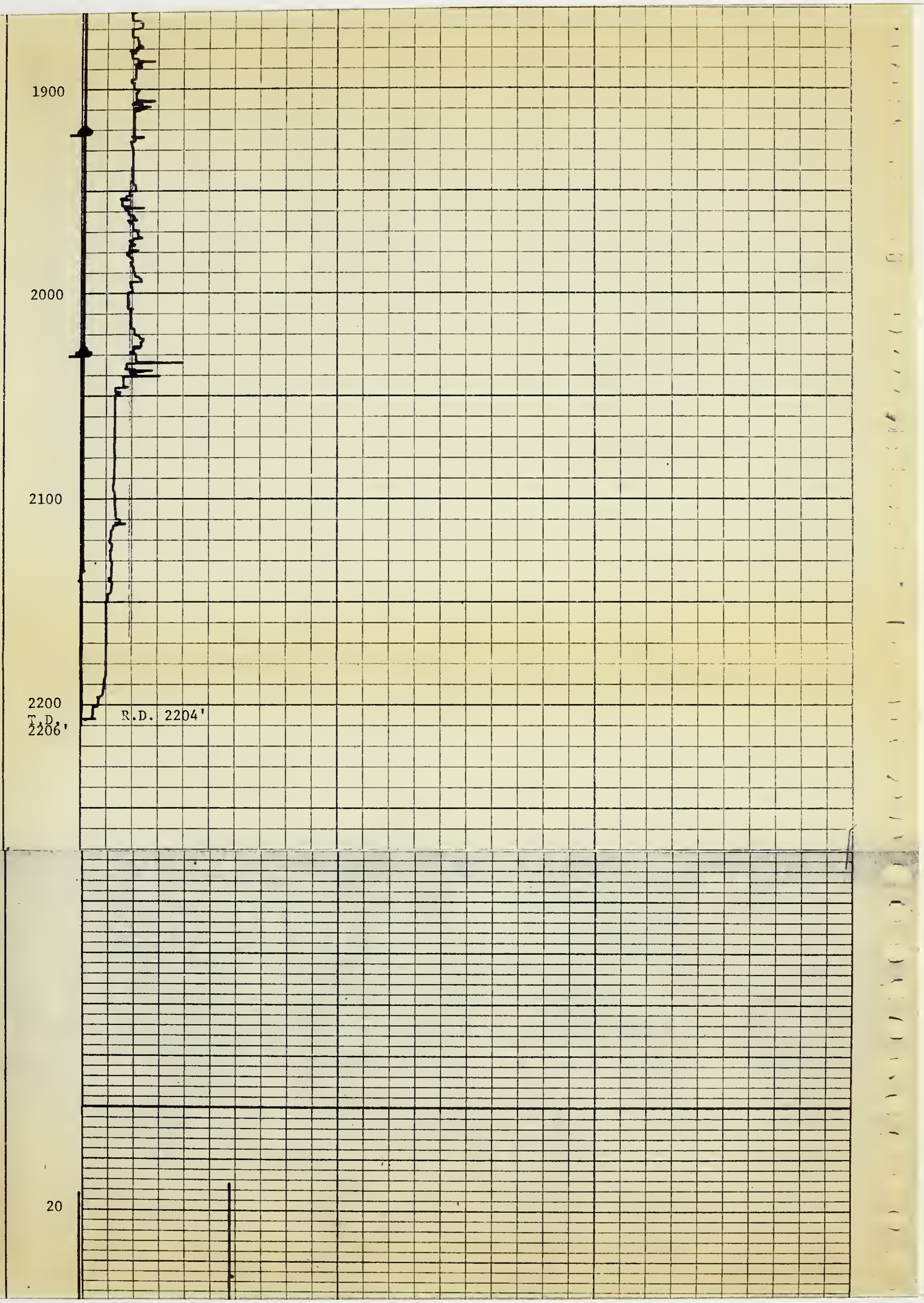
REMARKS: (N.A. MEANS NOT AVAILABLE)

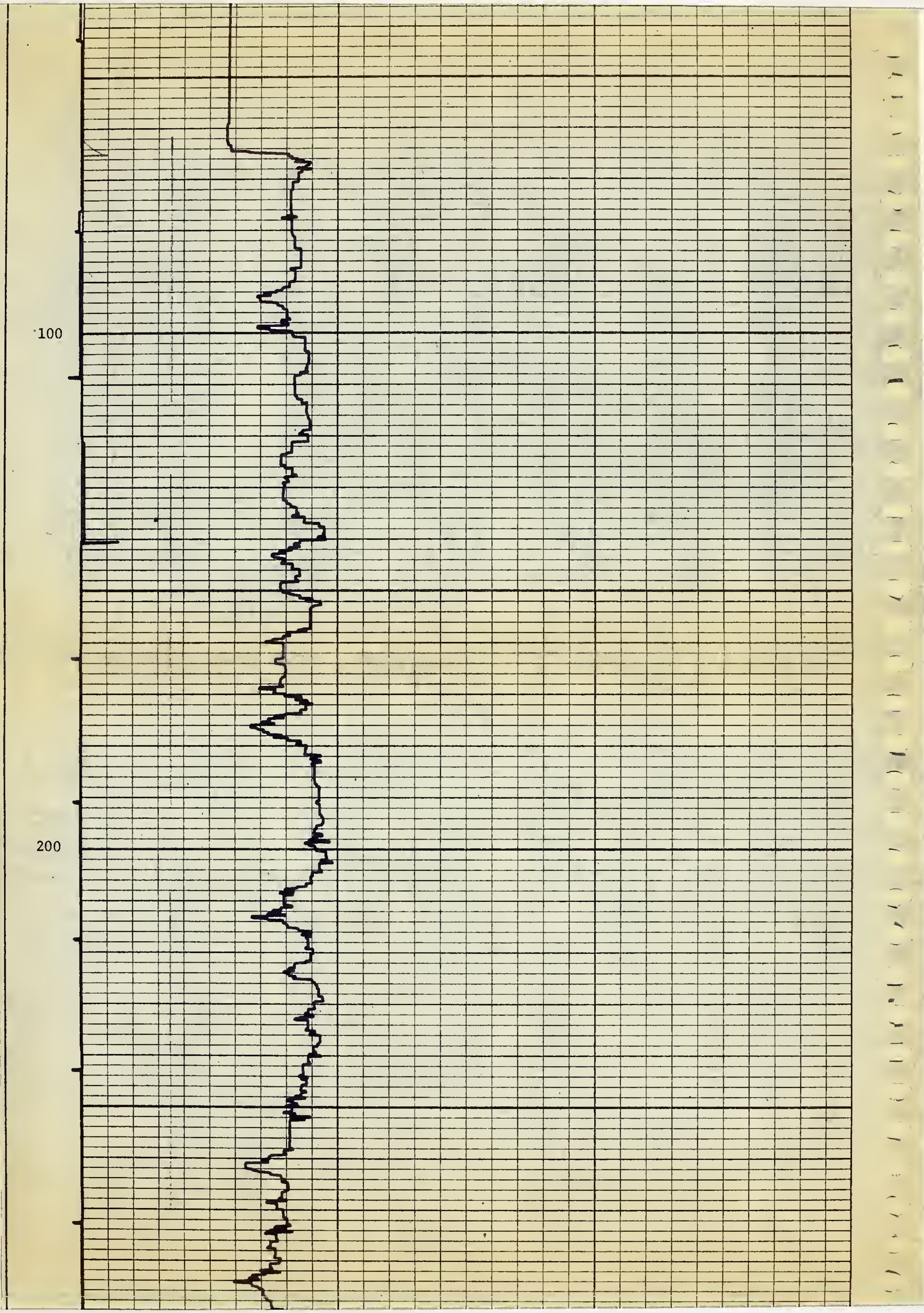


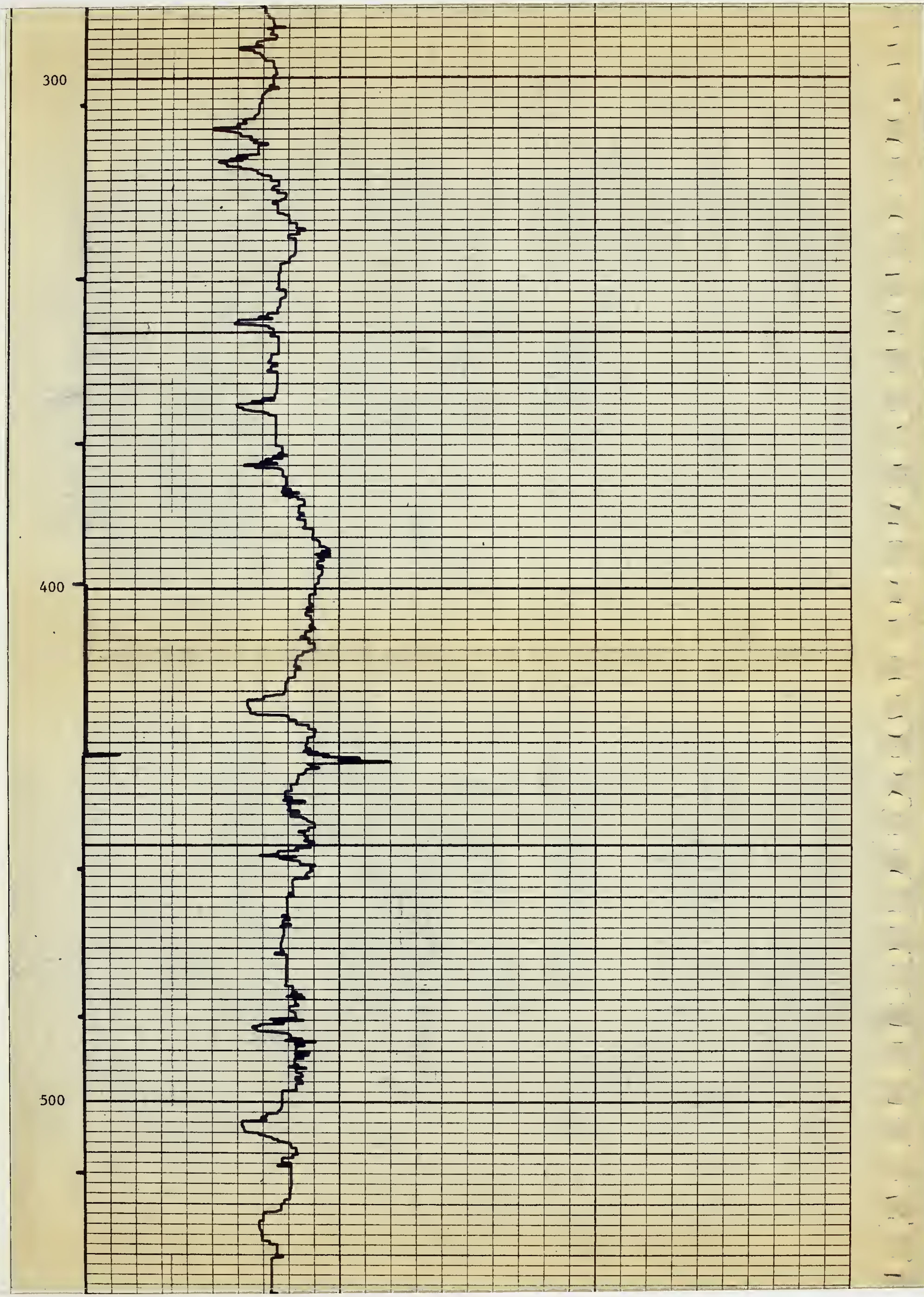

CSG.
BIT SIZE
0
100
200
300
400
500
600

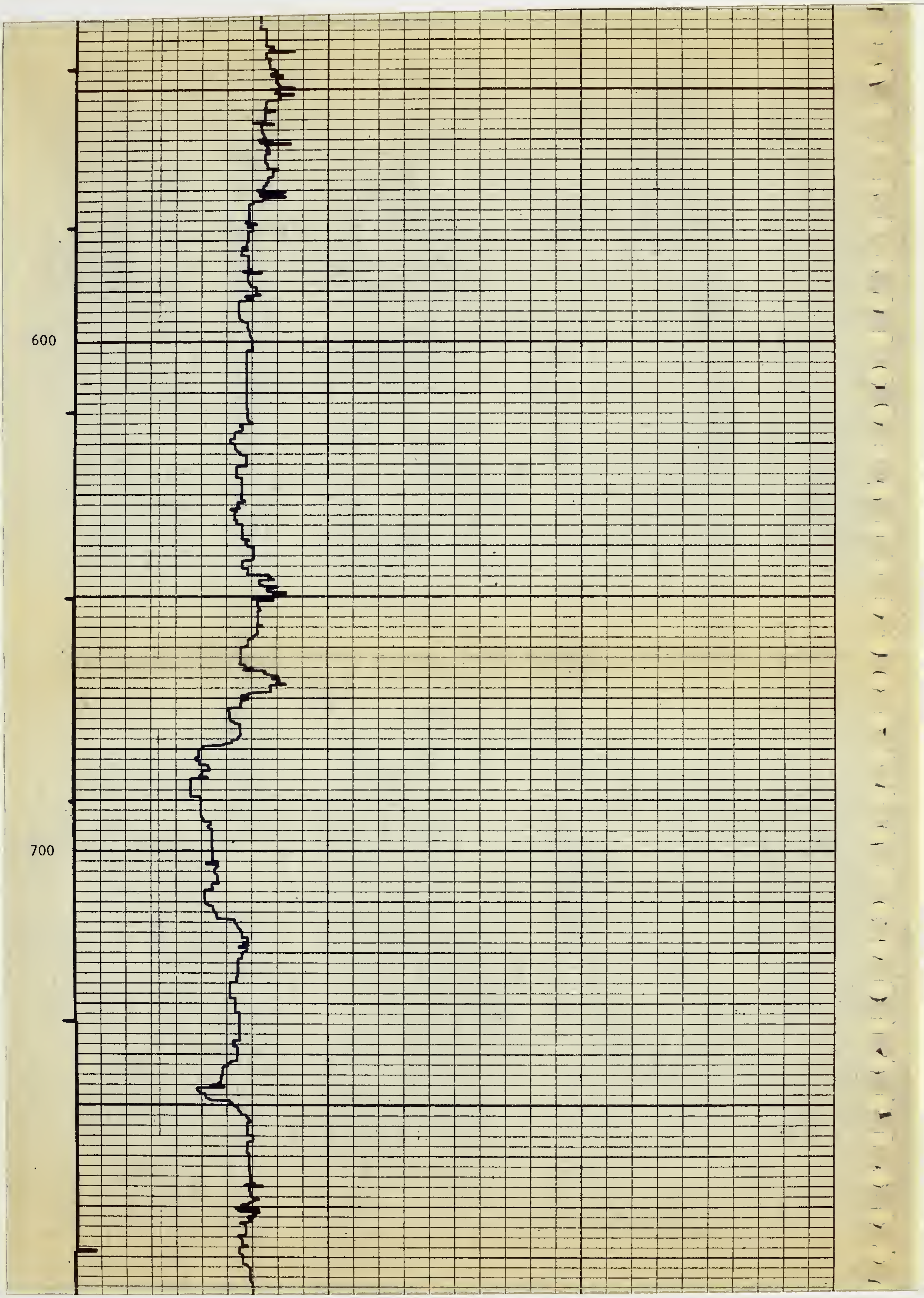

700
800
900
1000
1100
1200

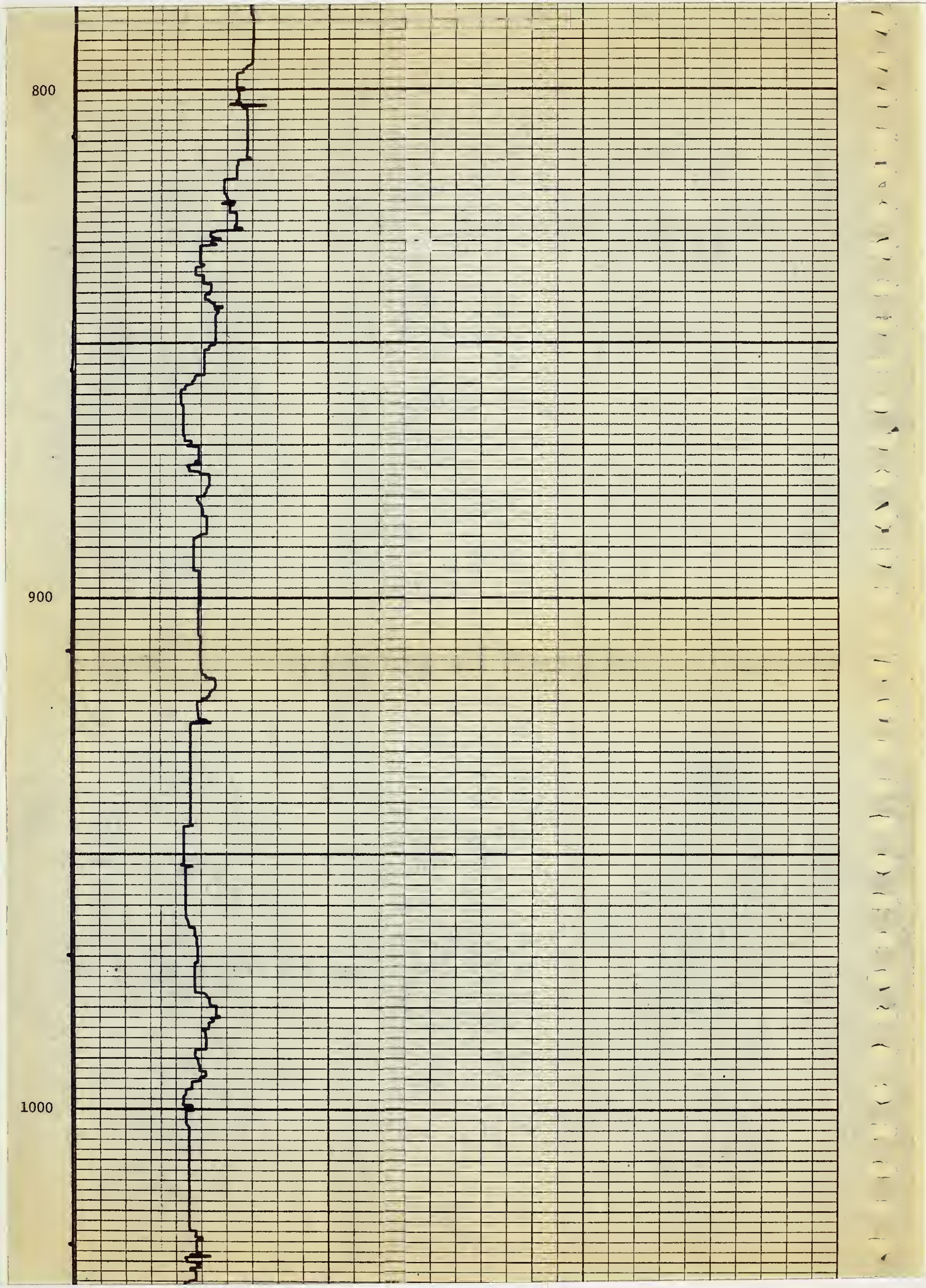

1300
1400
1500
1600
1700
1800

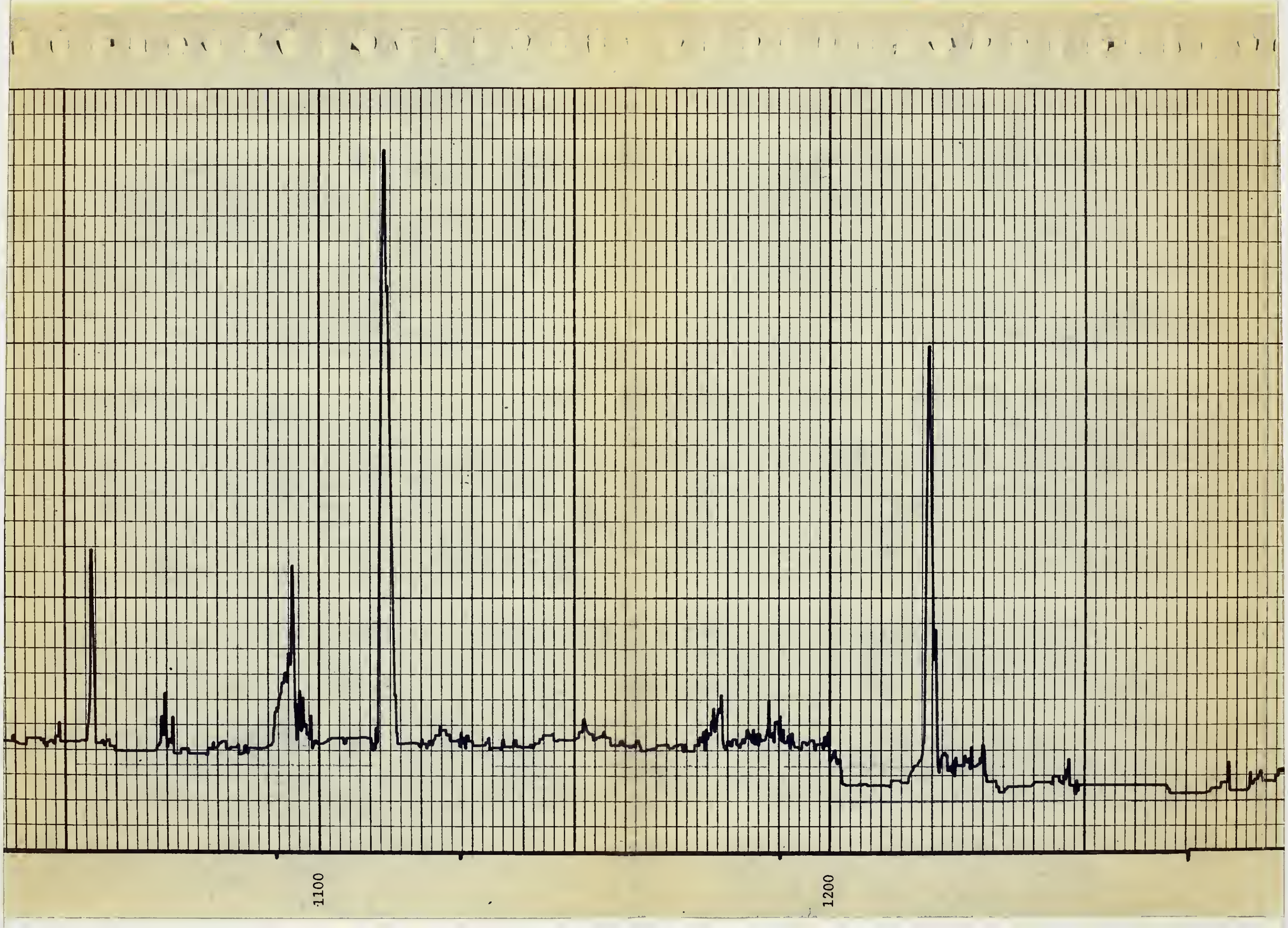

1900
2000
2100
2200
T.D.
2206'
R.D. 2204'
20

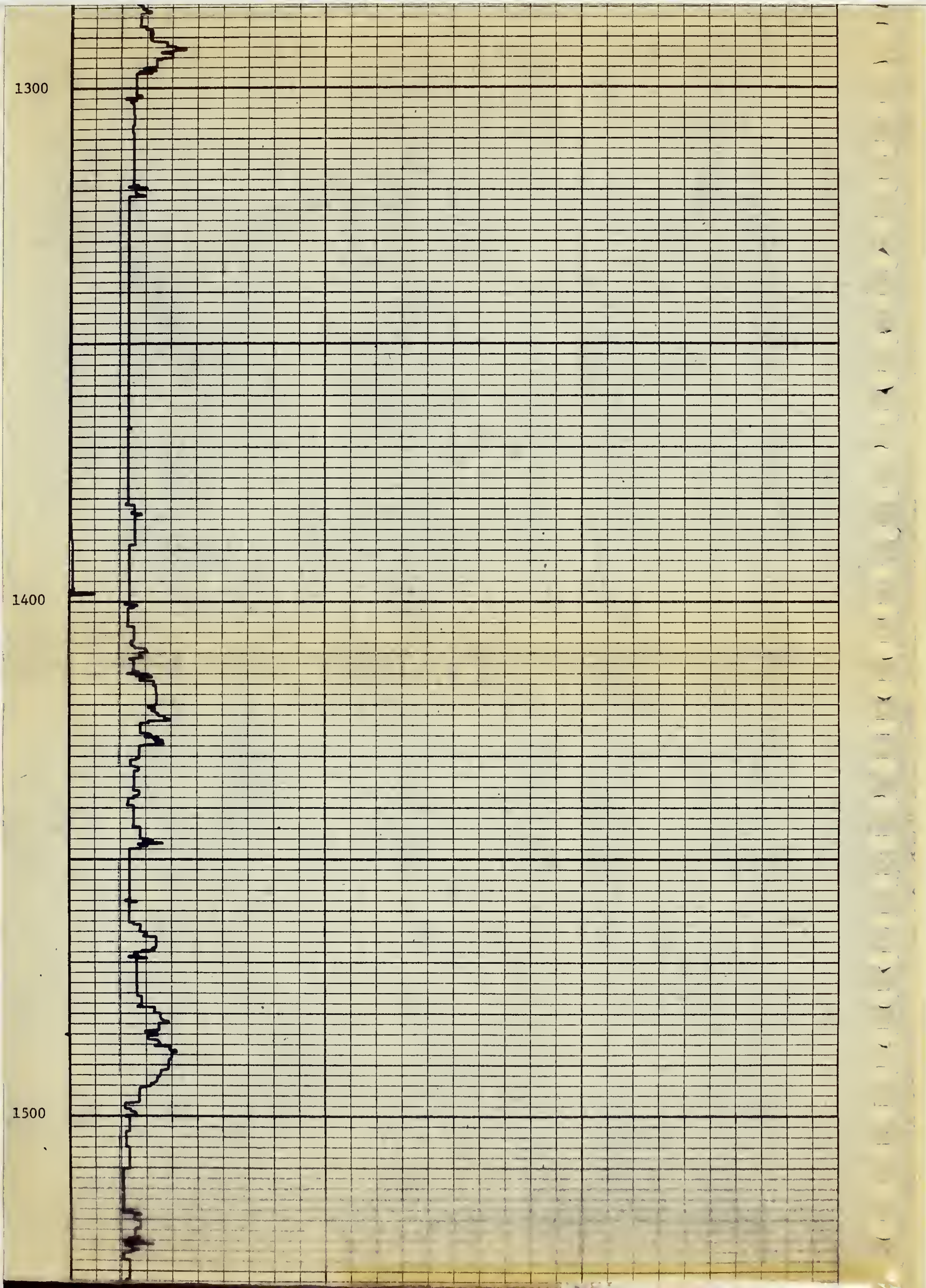

100
200

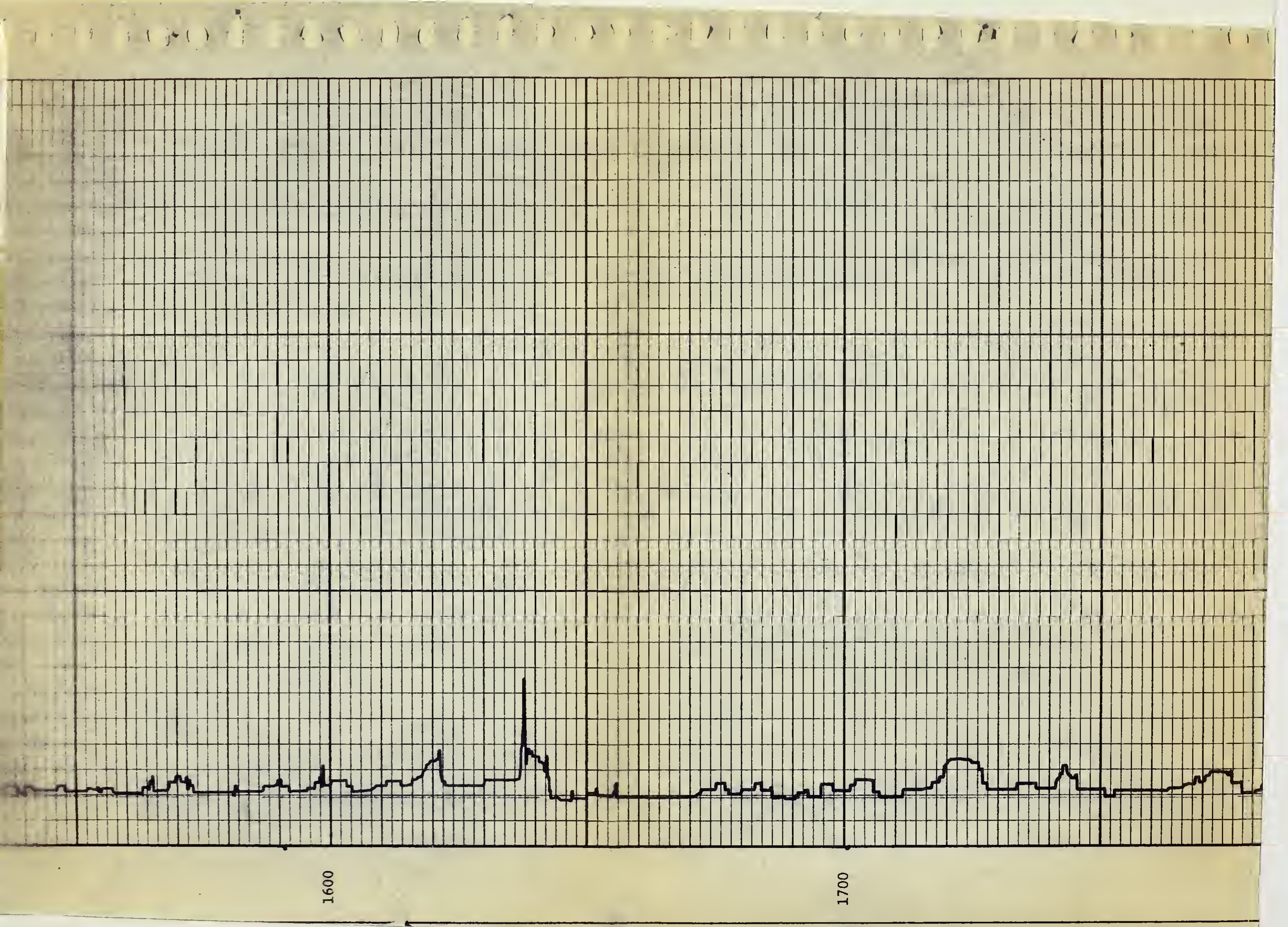

300
400
500

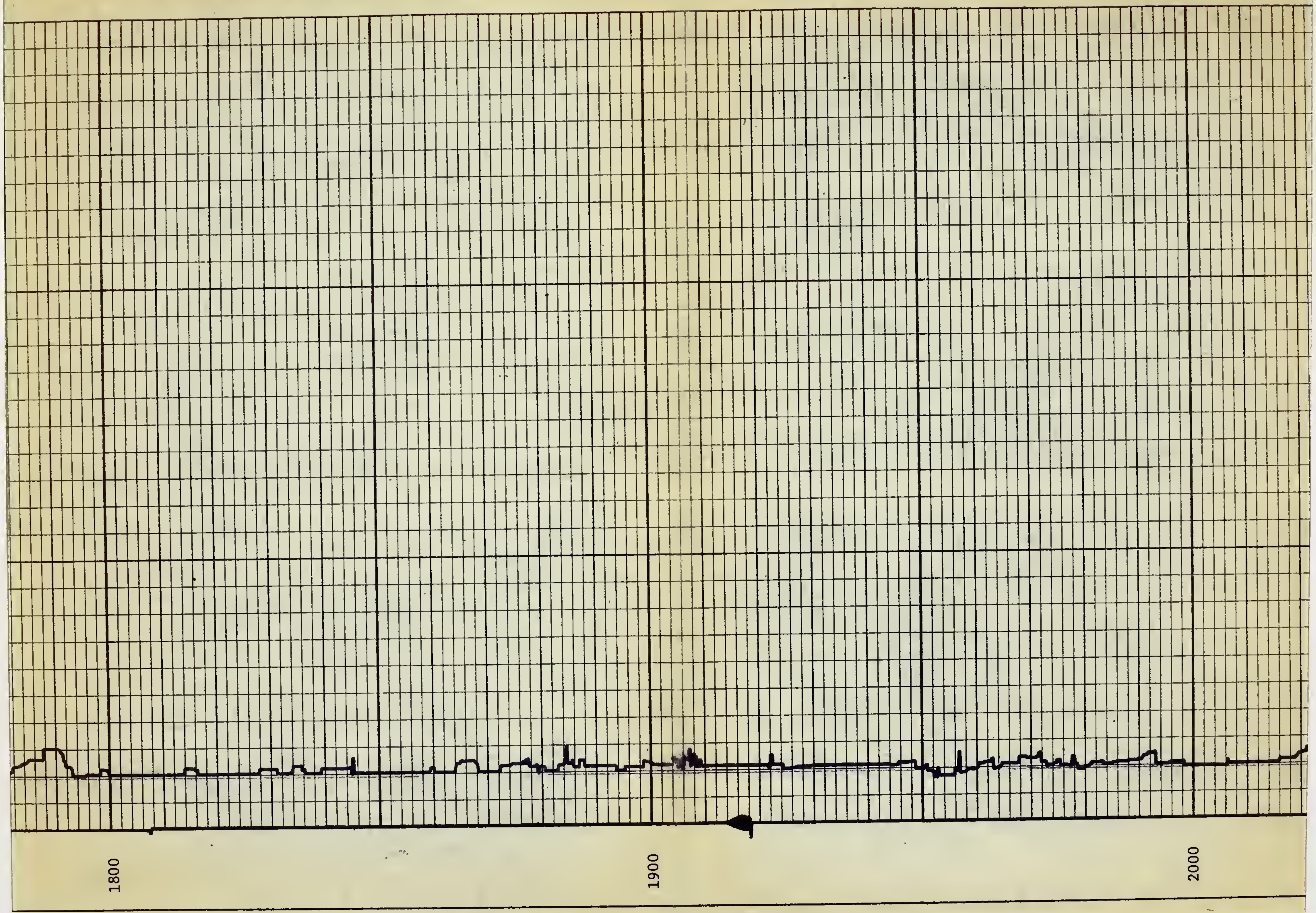

600
700

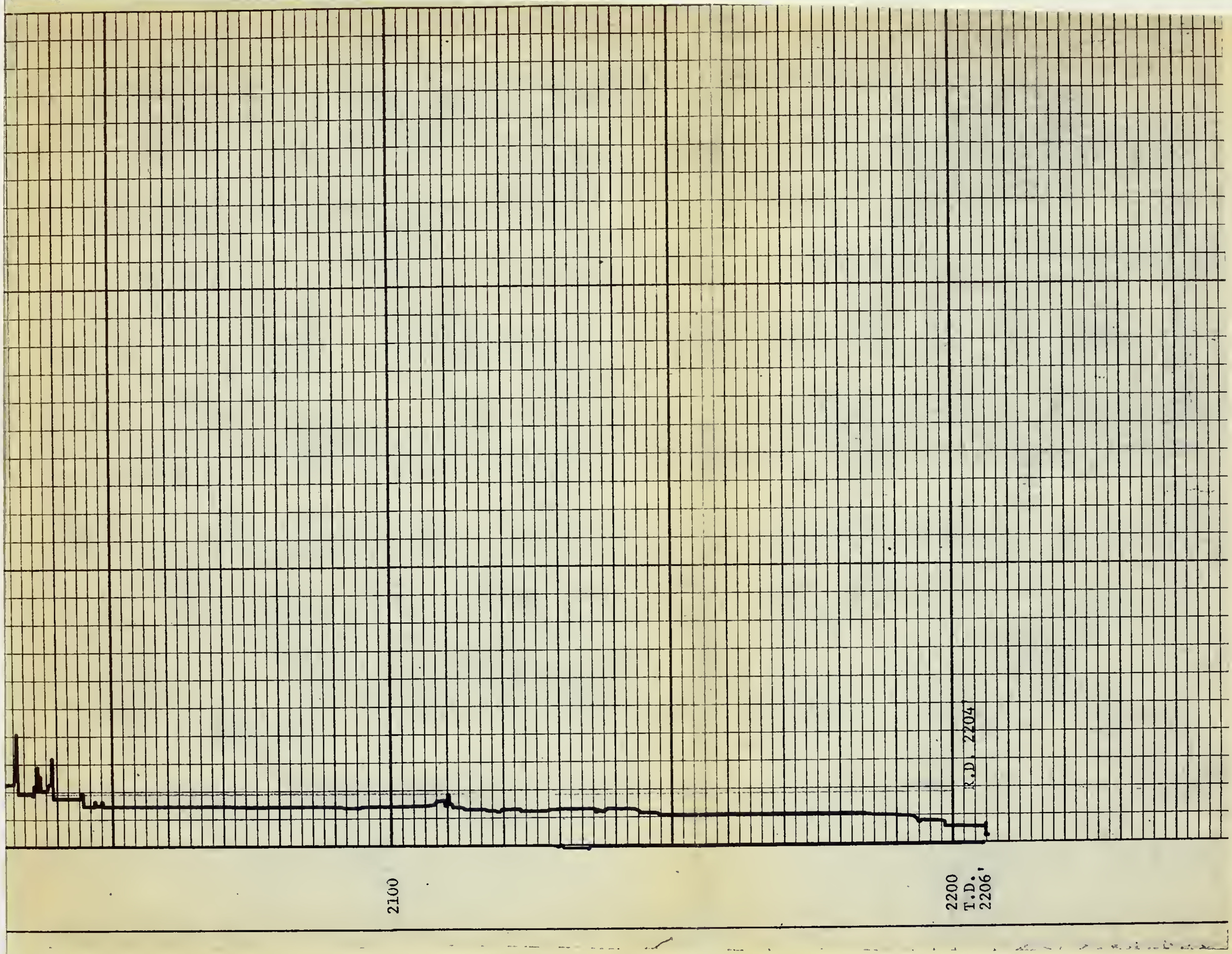

800
900
1000


1100
1200


1300
1400
1500


1600
1700


1800
1900
2000


R.D. 2204'
2100
2200
T.D.
2206'

Birdwell

Temperature Log

FILING NO.

COMPANY ATLANTIC RICHFIELD COMPANY, ET. AL.

WELL SORGNUM GULCH #H-10

FIELD

COUNTY RIO BLANCO **STATE** COLORADO

LOCATION:
97' FNL & 184' FEL

SEC. 13 **TWP.** 3S **RGE.** 97W

OTHER SERVICES:
CAL FDL V3D
GR ENP ES

PERMANENT DATUM GROUND LEVEL **ELEV.** 6950'
LOG MEASURED FROM GL
DRILLING MEASURED FROM GL

ELEVATIONS:
KB.
DF.
GL. 6950'

DATE	29 JUNE 74		
RUN NO.	1		
TYPE LOG	TL		
DEPTH—DRILLER	2211		
DEPTH—LOGGER	2206		
BOTTOM LOGGED INTERVAL	2206		
TOP LOGGED INTERVAL	400		
TYPE FLUID IN HOLE	WATER		
SALINITY PPM CL.			
DENSITY LB./GAL.			
LEVEL	394		
MAX. REC. TEMP.—DEG. F.	98°		
OPR. RIG TIME	1 HR.		
RECORDED BY	WILSON		
WITNESSED BY	TAIT		
LOCATION	LAS VEGAS		

RUN NO.	BORE HOLE RECORD			CASING RECORD			
	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1				7"		0	62'
	5-5/8"	62'	1200'				
	4-7/8"	1200'	2211'				

55C-609-B

WELL DATA

TYPE WELL			
RUN NO.			
PROD. OR INJ. RATE			
WELL HEAD PRESSURE			
TYPE & AMT. CEMENT			
LENGTH OF TIME: PROD. OR INJECTING			
SHUT IN			
SINCE CEMENTING			
PURPOSE OF SURVEY			

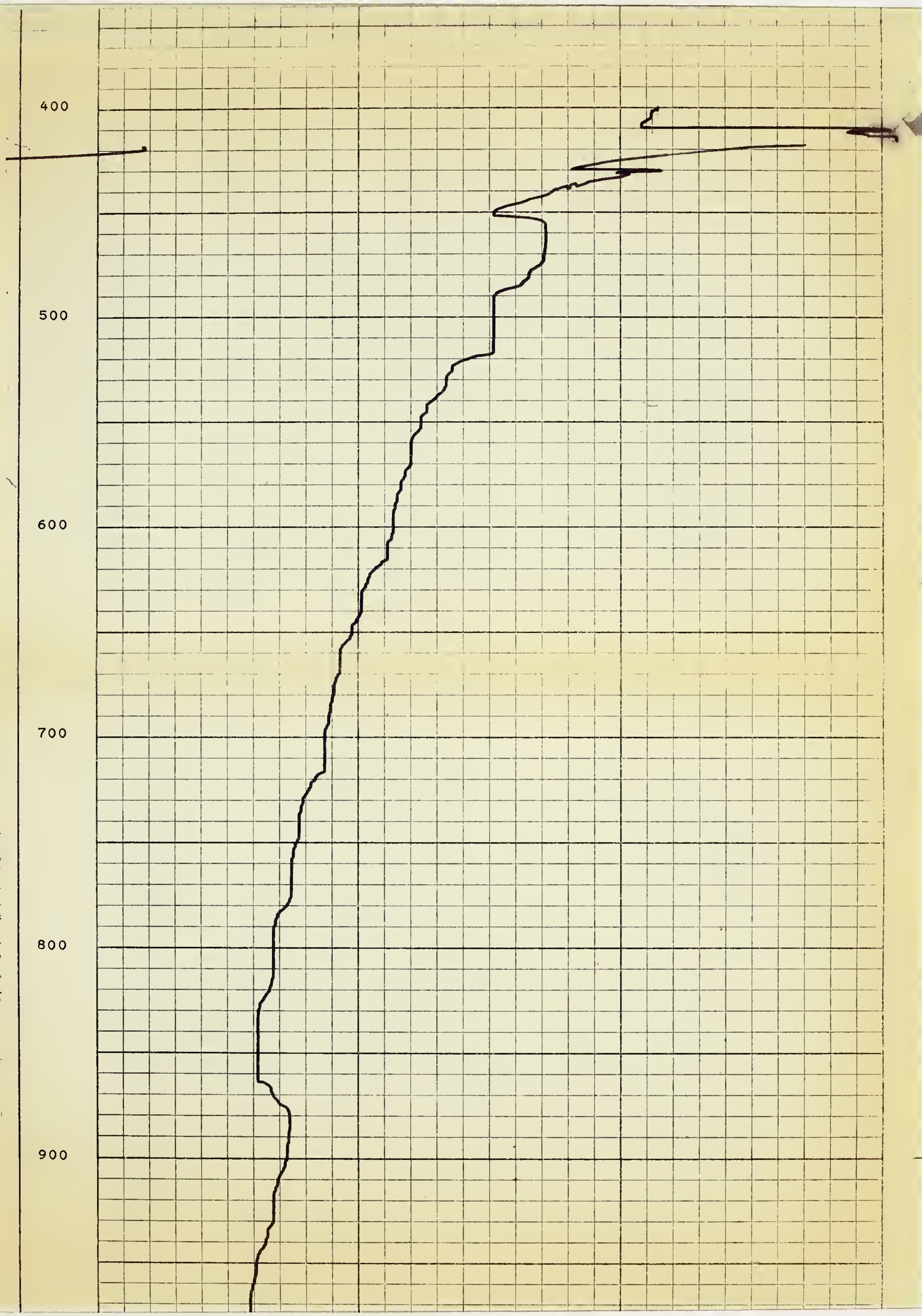
EQUIPMENT DATA

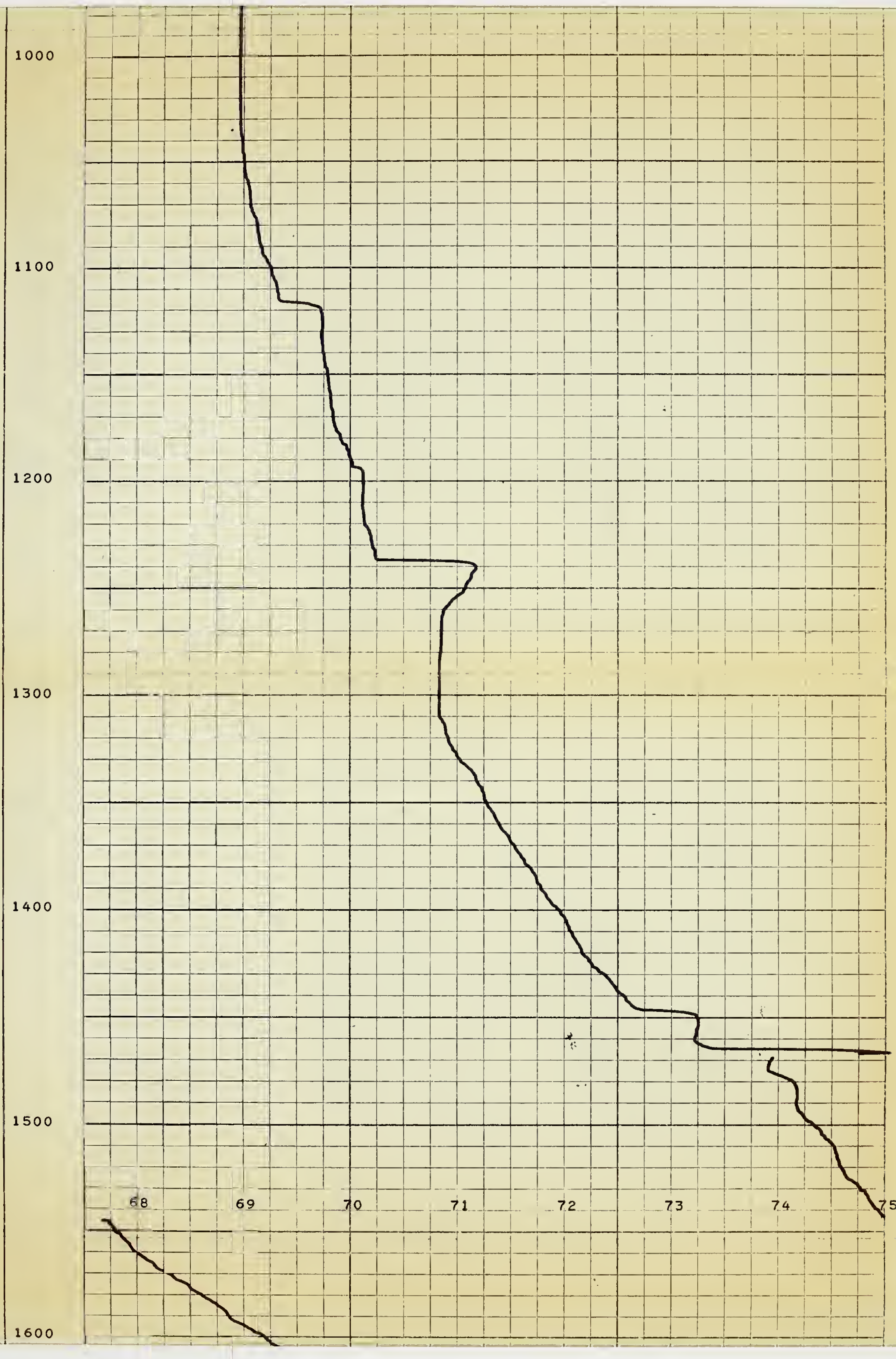
TYPE LOG	TL		
RUN NO.	1		
TOOL MODEL NO.	LDAH-6010		
DIAM.	3-5/8"		
SPEED FT./MIN.	60		
T.C. - SEC.	1		
SCALE	1/4°/DIV.		

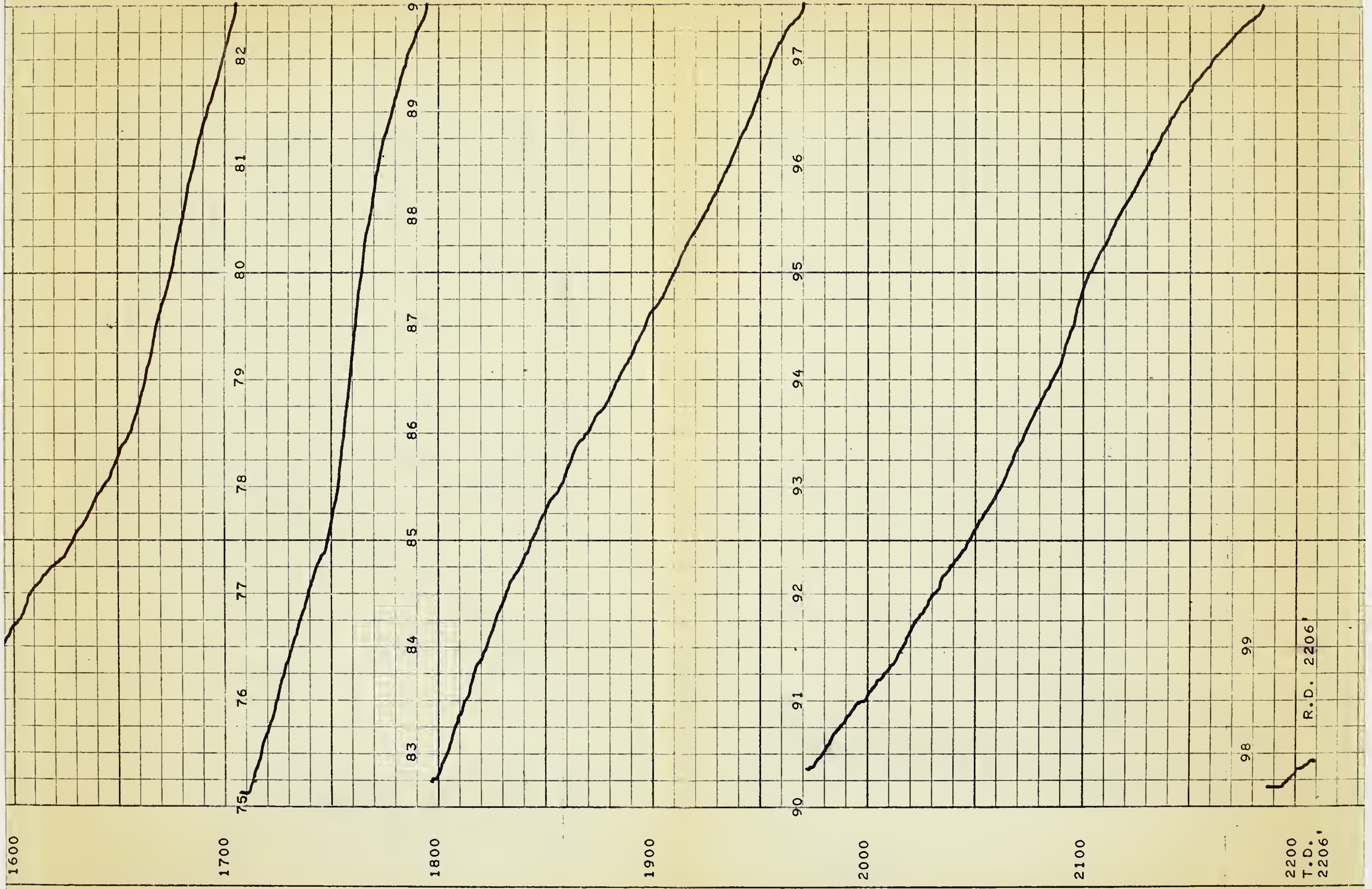
GENERAL

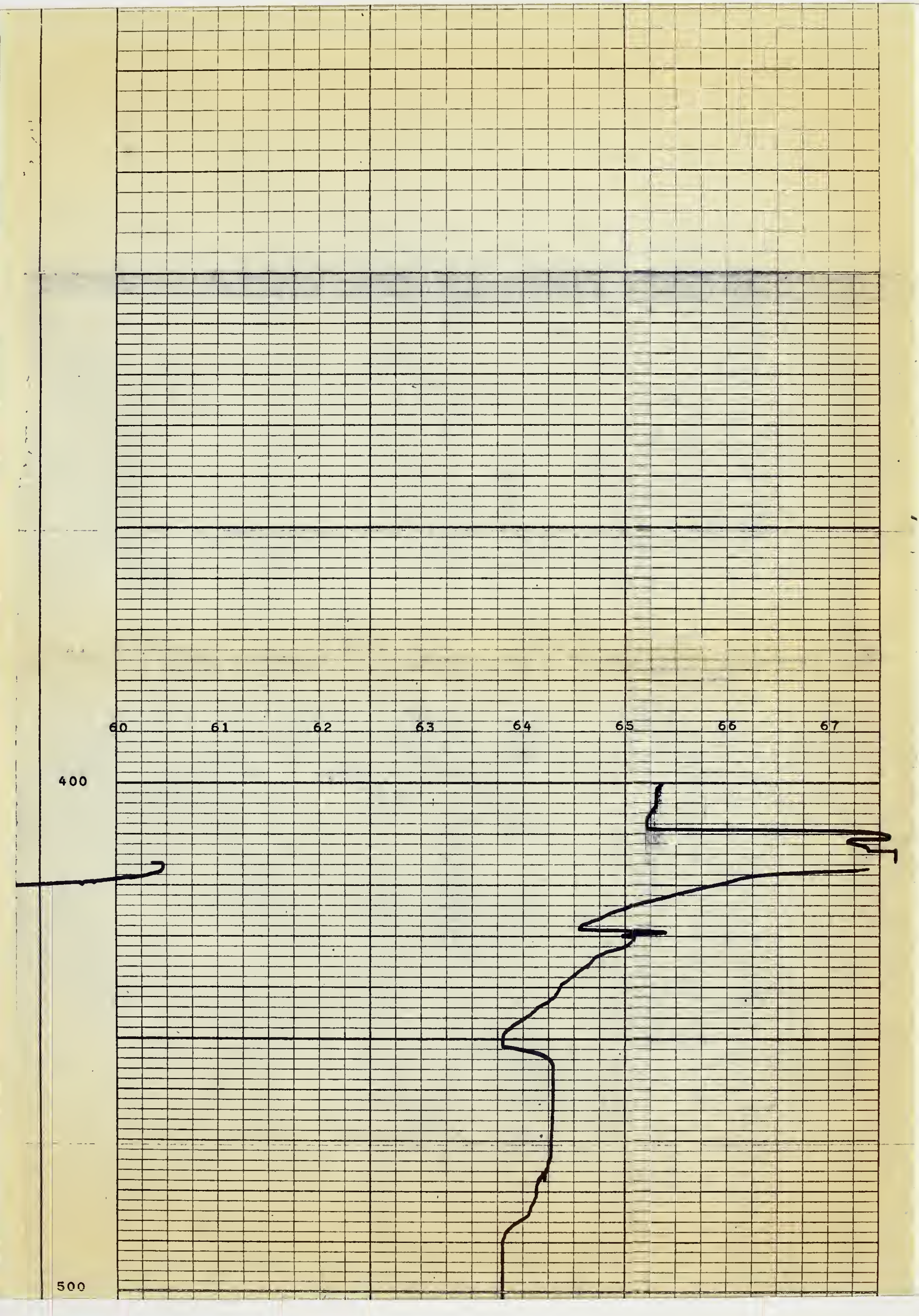
HOIST TRUCK NO.	2694		
INST. TRUCK NO.	2694		
TOOL SERIAL NO.			

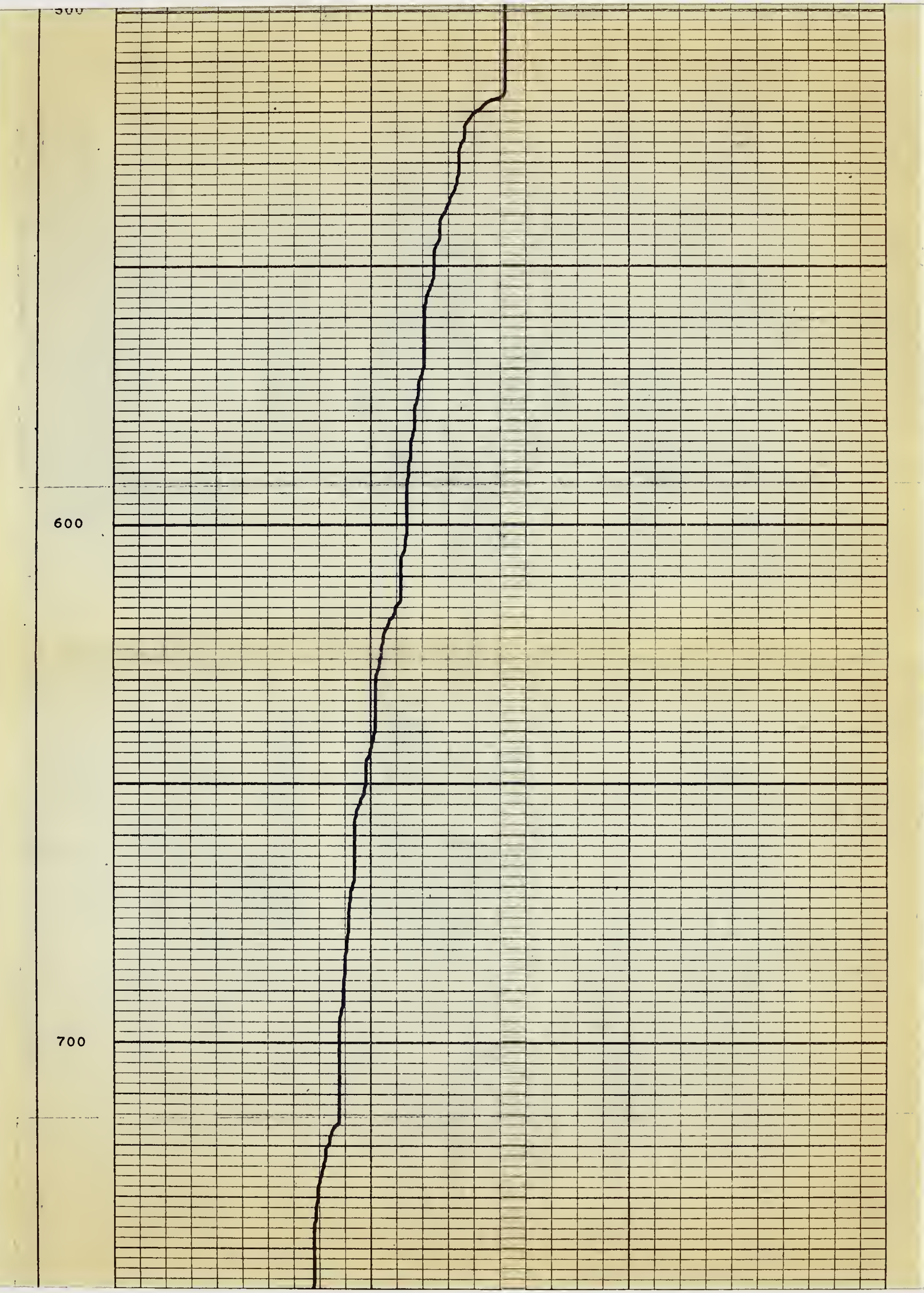
REMARKS: N.A. Means not available

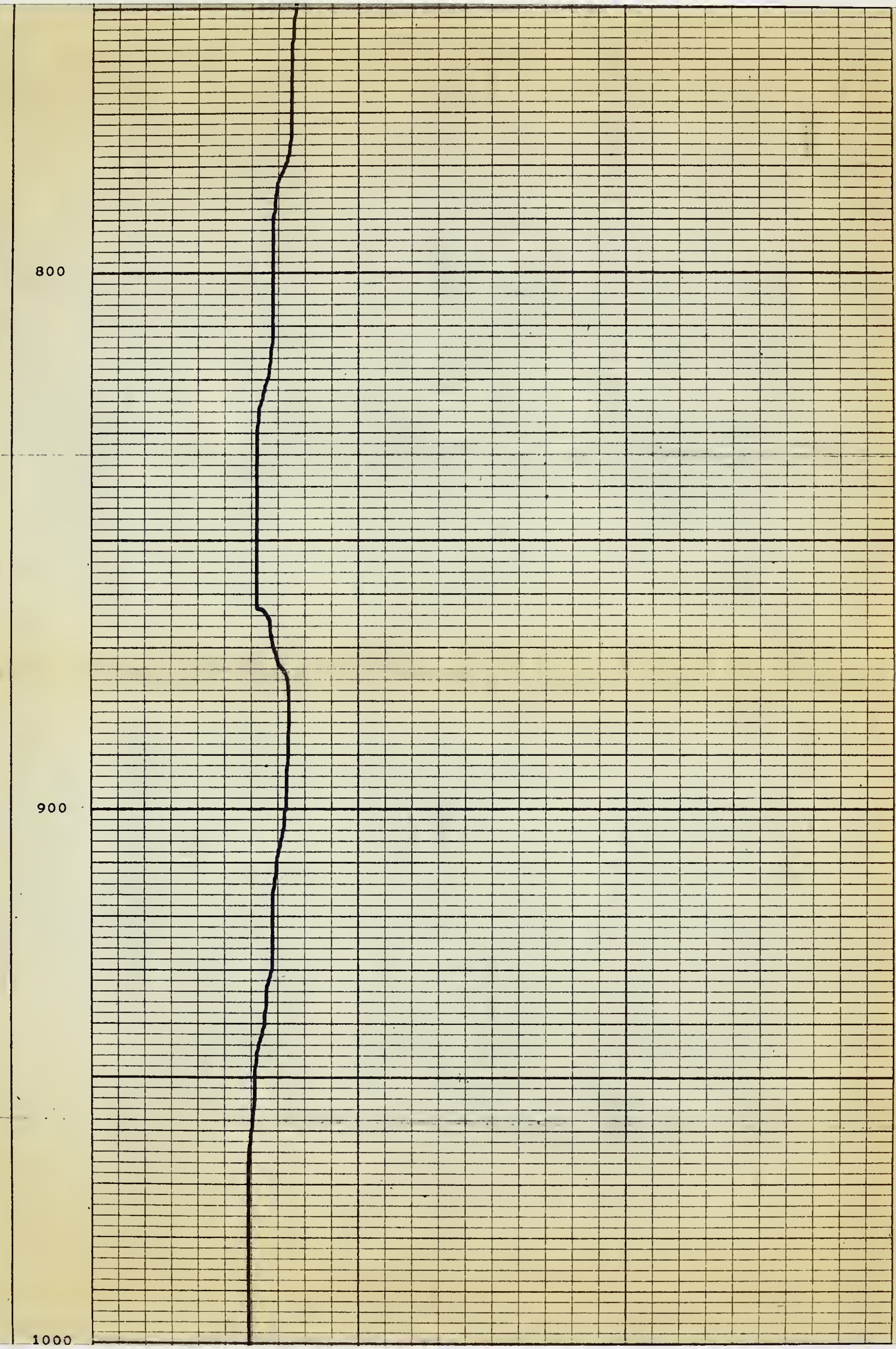

400
500
600
700
800
900

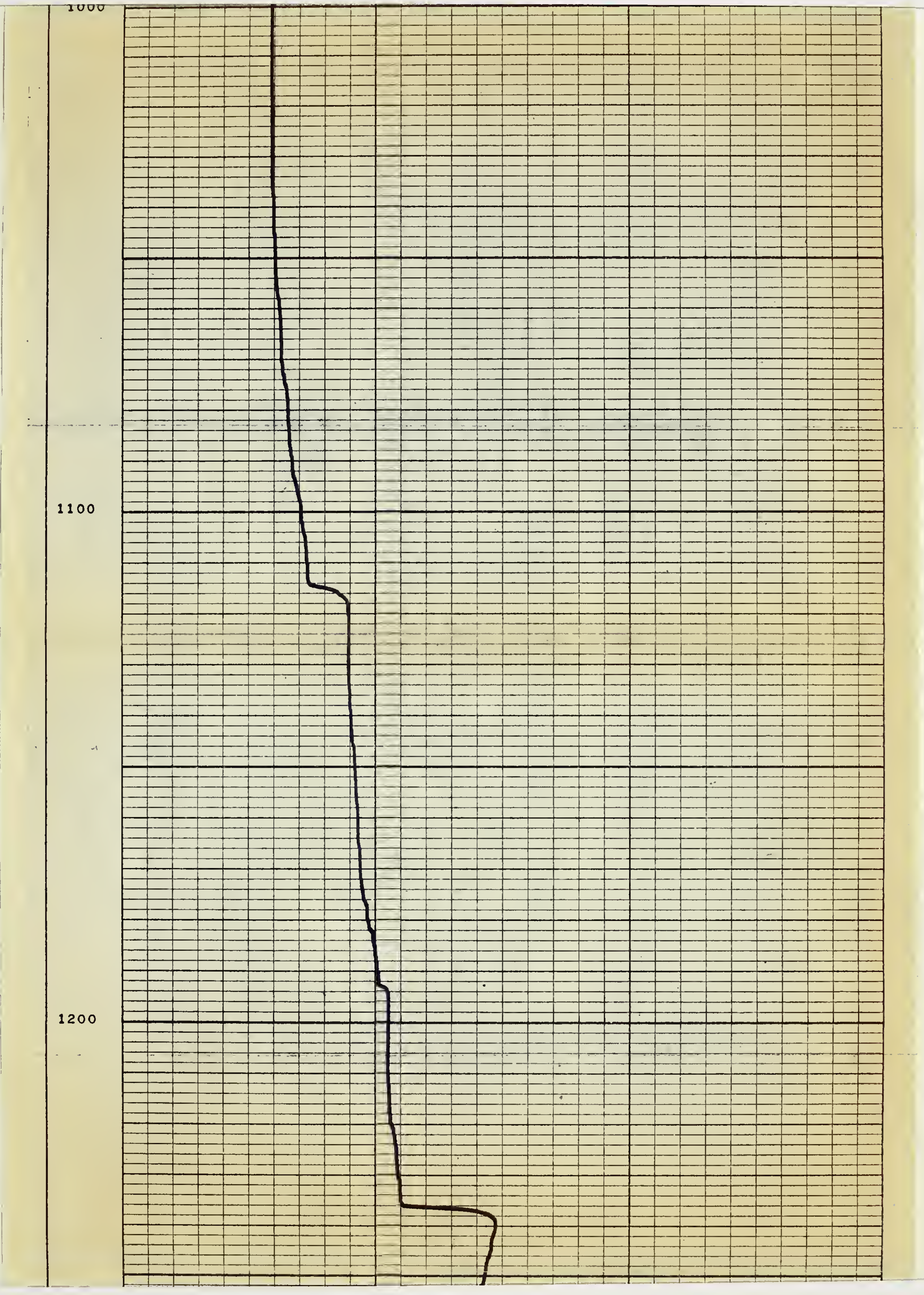

1000
1100
1200
1300
1400
1500
1600
68
69
70
71
72
73
74
75


1600
1700
1800
1900
2000
2100
2200
T.D.
2206'
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
90
91
92
93
94
95
96
97
98
99
R.D. 2206'


60
61
62
63
64
65
66
67
400
500


500
600
700


800
900
1000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1100
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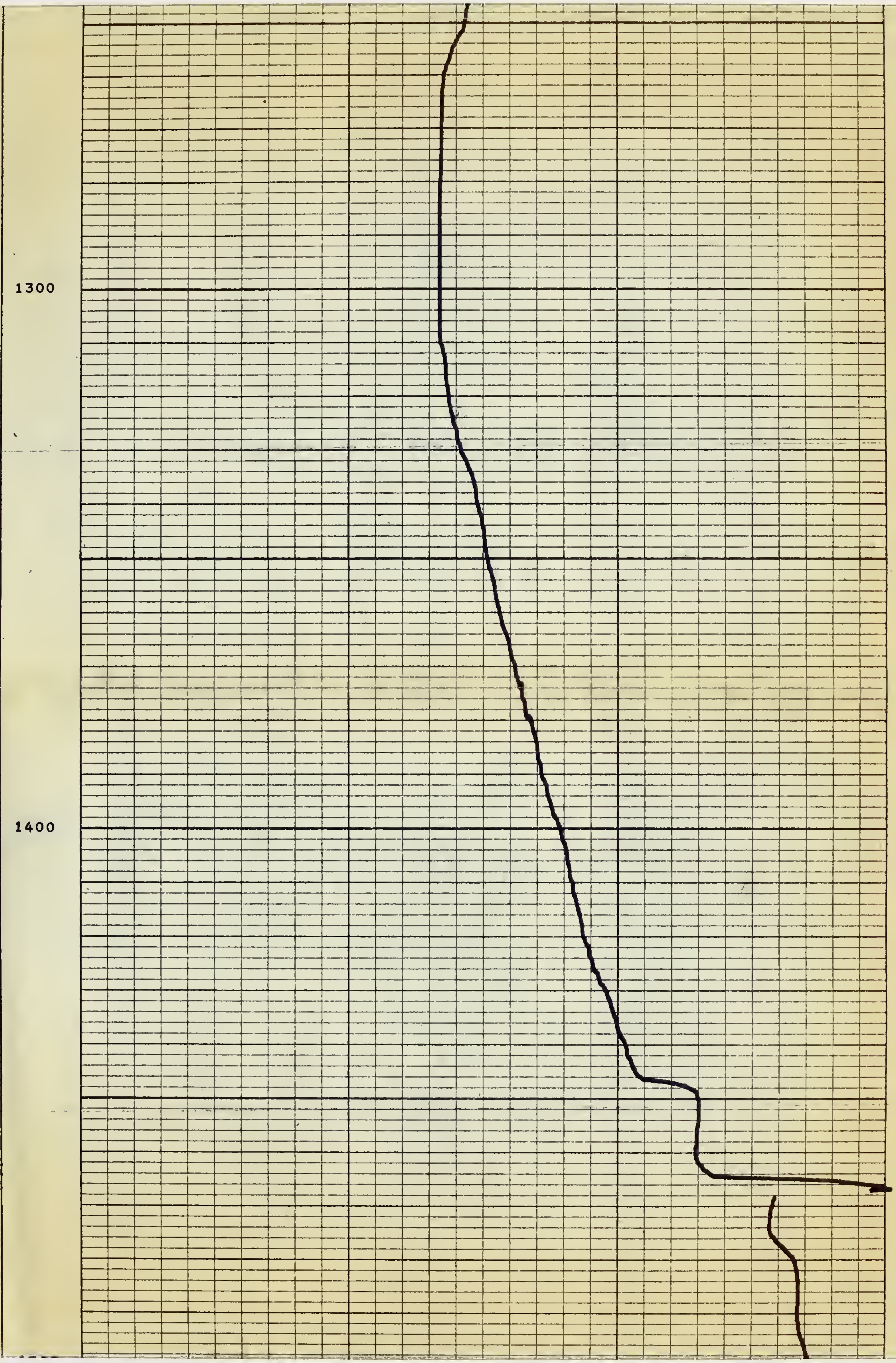
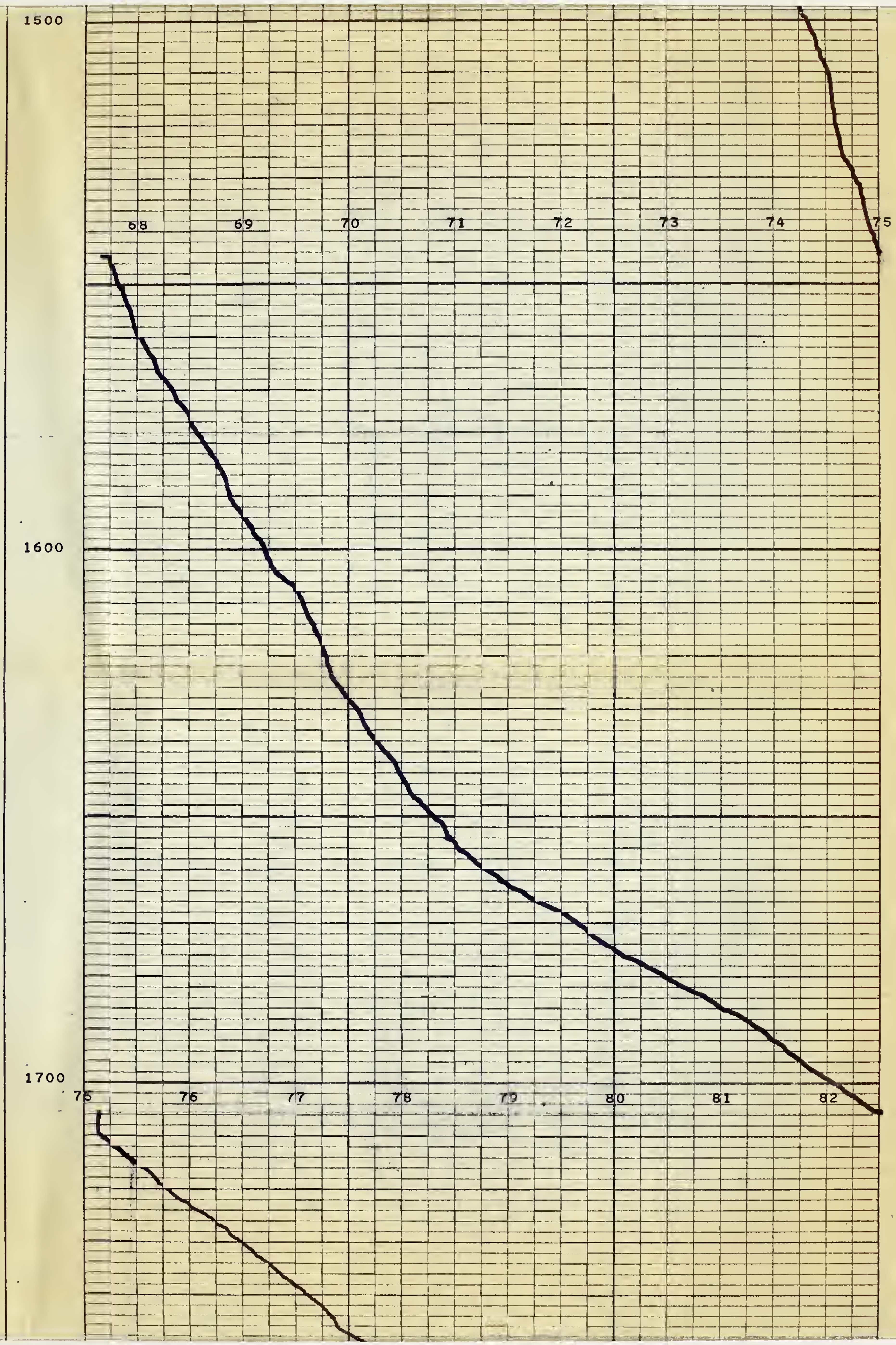
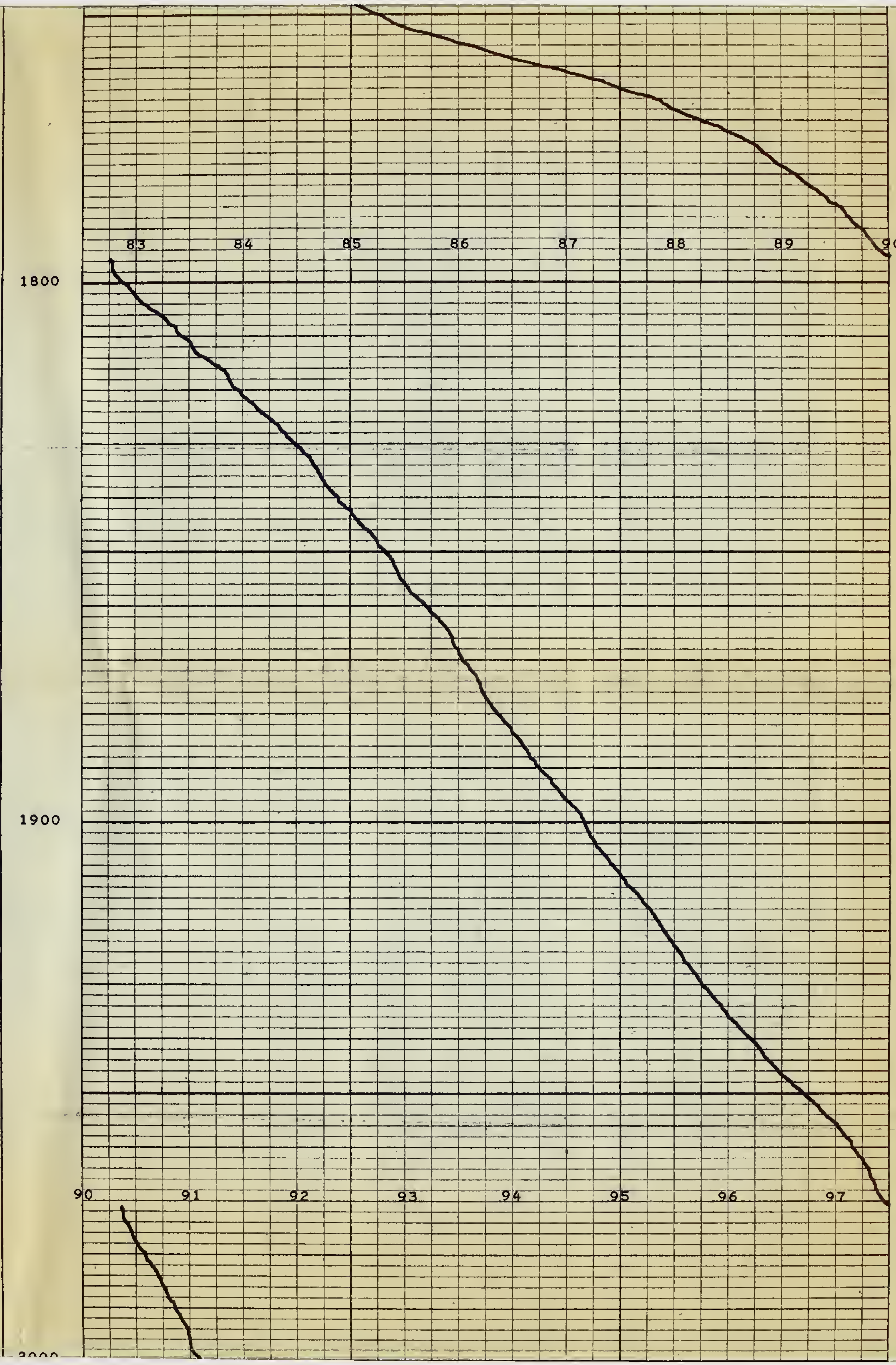
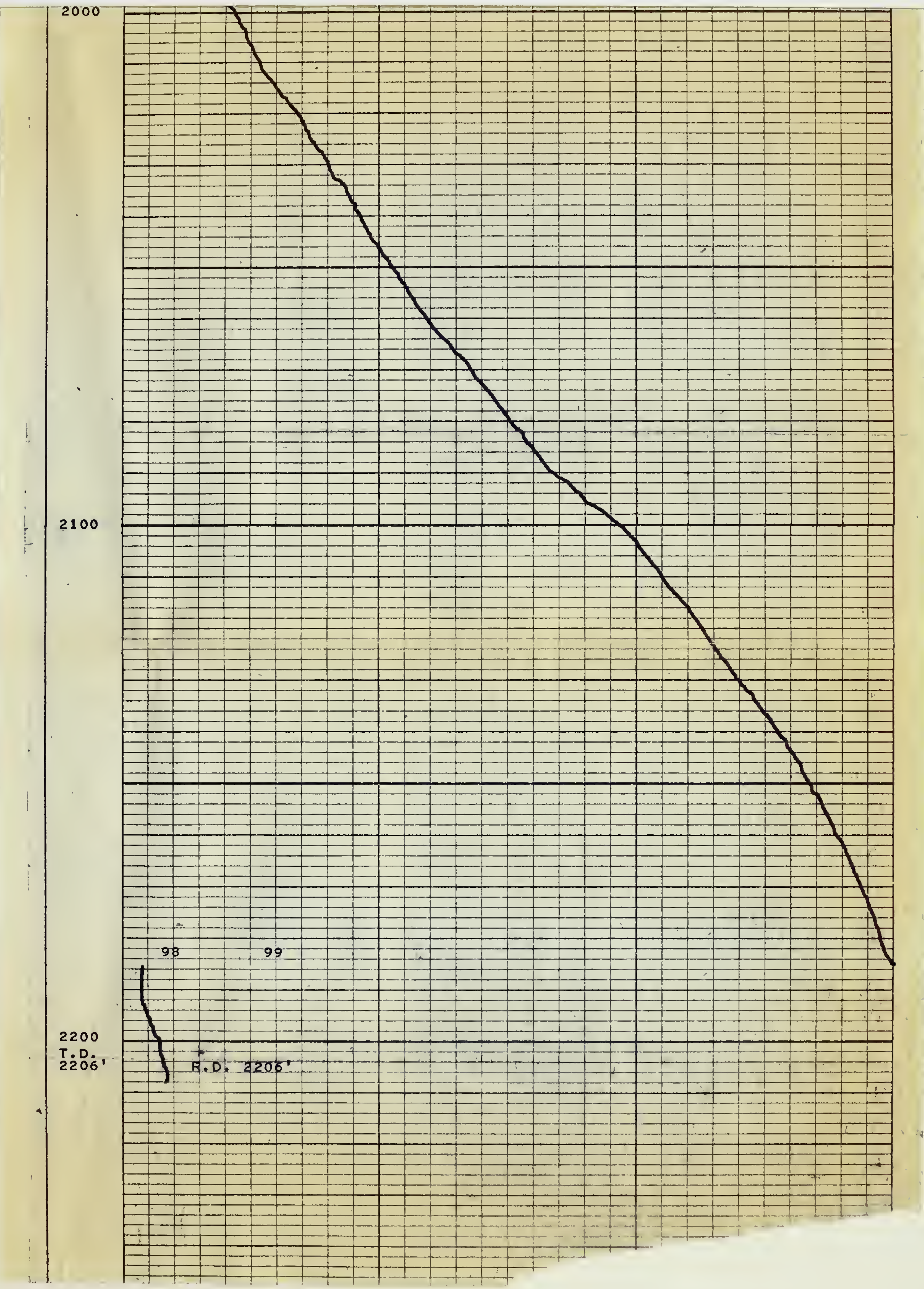

1300
1400



1500
1600
1700
68
69
70
71
72
73
74
75
75
76
77
78
79
80
81
82


83
84
85
86
87
88
89
90
1800
1900
90
91
92
93
94
95
96
97


2000
2100
98
99
2200
T.D.
2206'
R.D. 2206'

COREHOLE SG-11

THIS ENVELOPE CONTAINS THE FOLLOWING GEOPHYSICAL LOGS:

Schlumberger:	Borehole Compensated Sonic Laterolog Temperature

II B-367

Schlumberger

BOREHOLE COMPENSATED SONIC LOG - GAMMA RAY
(WITH CALIPER)

COUNTY RIO BLANCO
FIELD or LOCATION SORGHUM GULCH
WELL SORGHUM GULCH #11
COMPANY ATLANTIC RICHFIELD

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #11

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

Location: 12' NSL & 160' WEL
API Serial No.
Sec. 7 Twp. 3S Rge. 96W

Other Services:
TEMP
DLL-9

Permanent Datum: G.L.; Elev.: 6900
Log Measured From G.L., 0 Ft. Above Perm. Datum
Drilling Measured From G.L.

Elev.: K.B.
D.F. -
G.L. 6900

Date	9-3-74			
Run No.	ONE			
Depth—Driller	2826			
Depth—Logger	2824			
Btm. Log Interval	2815			
Top Log Interval	50			
Casing—Driller	8 5/8 @ 62	@	@	@
Casing—Logger	50			
Bit Size	6 1/4 TO 1282, 4 7/8 TO TD			
Type Fluid in Hole	WATER			
Fluid Level	393			
Dens. | Visc.	- | -			
pH | Fluid Loss	- | - ml	ml	ml	ml
Source of Sample	MUDPIT			
R_m @ Meas. Temp.	3.52 @ 87 °F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	- @ °F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	- @ °F	@ °F	@ °F	@ °F
Source: R_{mf} | R_{mc}				
R_m @ BHT	2.42 @ 127 °F	@ °F	@ °F	@ °F
Time Since Circ.	2 DAYS			
Max. Rec. Temp.	127 °F	°F	°F	°F
Equip. | Location	5639 | VRNL			
Recorded By	ED MIXA			
Witnessed By	BERKHEISER			

FOLD HERE

The well name, location and borehole reference data were furnished by the customer.

SCALE CHANGES

Type Log	Depth	Scale Up Hole	Scale Down Hole

CHANGES IN MUD TYPE OR ADDITIONAL SAMPLES

Date		
Sample No.		
Depth - Driller		
Type Fluid in Hole		
Dens. | Visc.		
ph | Fluid Loss	ml	ml
Source of Sample		
R_m @ Meas. Temp.	@ °F	@ °F
R_{mf} @ Meas. Temp.	@ °F	@ °F
R_{mc} @ Meas. Temp.	@ °F	@ °F
Source: R_{mf} | R_{mc}		
R_m @ BHT	@ °F	@ °F
R_{mf} @ BHT	@ °F	@ °F
R_{mc} @ BHT	@ °F	@ °F

REMARKS

Service Order No. - 2995

EQUIPMENT DATA

Run No.	ONE
Sonic Panel No.	JH-173
Sonic Cart No.	EA-253
Sonic Sonde No.	KB 45
Mem. Panel No.	B-265
G.R. Cart. No.	E-63
G.R. Panel No.	EA-299
Caliper No	D-1269
TTR No.	-
Cent. Device	NONE
Stand off - Inches	0
Time Const. - Sec.	2
Speed - F.P.M.	30

CALIBRATION DATA

CALIBRATION DATA

CALIBRATION:	BACKGND. CPS.	SOURCE CPS.	GALV. INCR. DIVISION	SENS. TAP (FOR CAL.)	SENS. TAP (RECORD)	TIME CONST.
GAMMA RAY:	80	500	100	0-200	0-200	2

All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to Clause 7 of our General Terms and Conditions as set out in our current Price Schedule.

GAMMA RAY
API UNITS

0 200
200 400

CALIPER
HOLE DIAM. IN INCHES

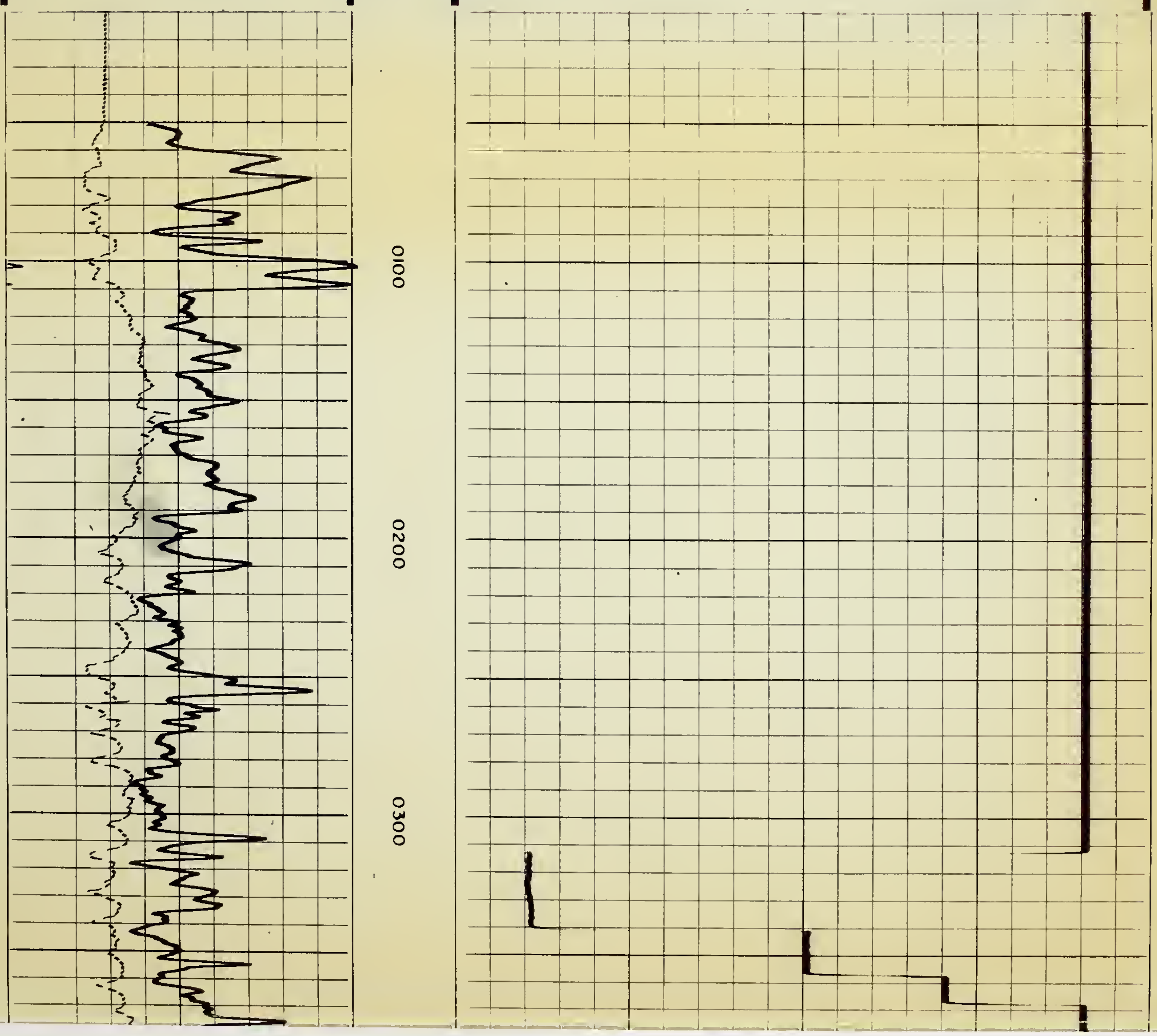
14"

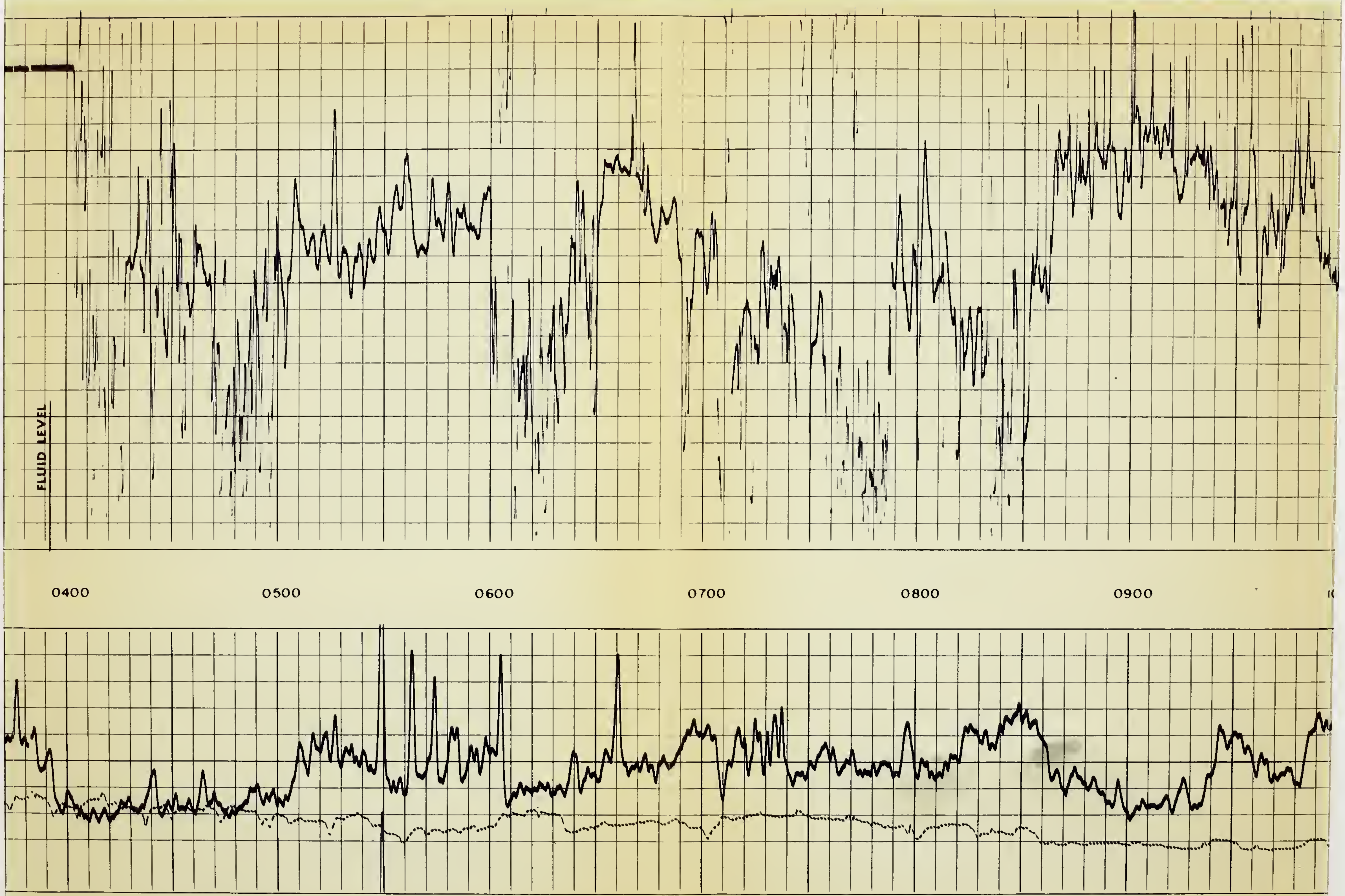
DEPTHS

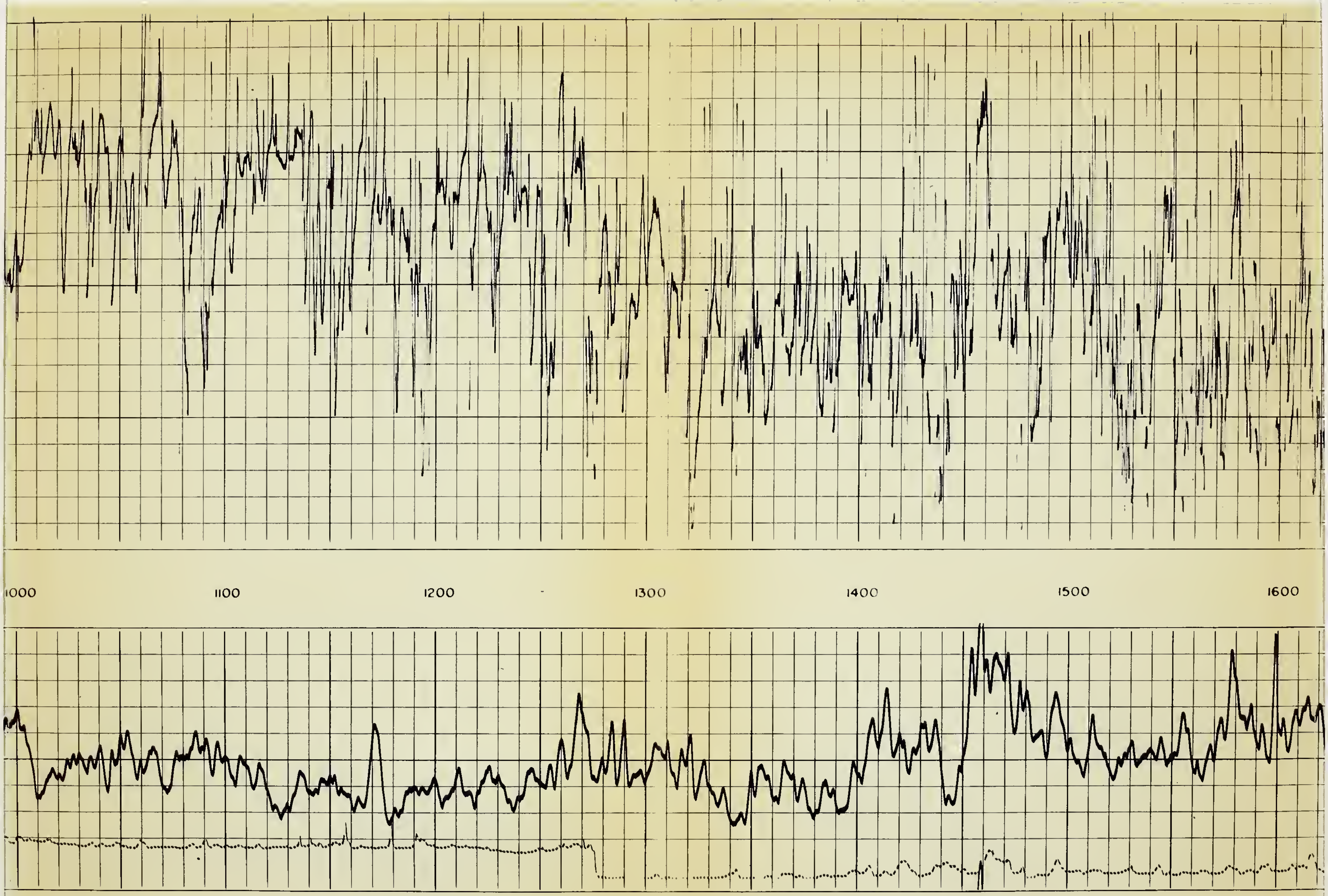
INTERVAL TRANSIT TIME
MICROSECONDS PER FOOT

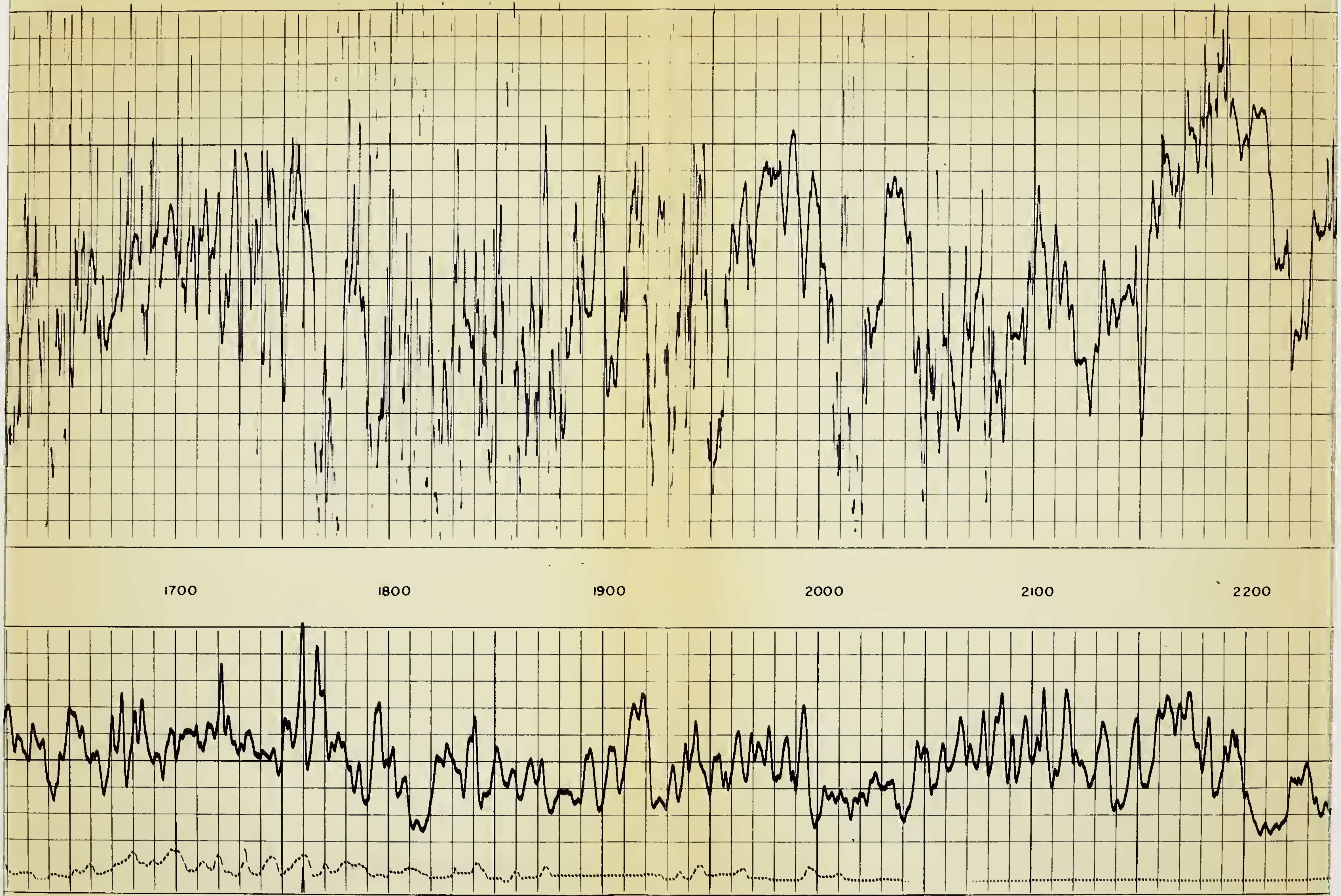
T 3 R_1 2 R_2

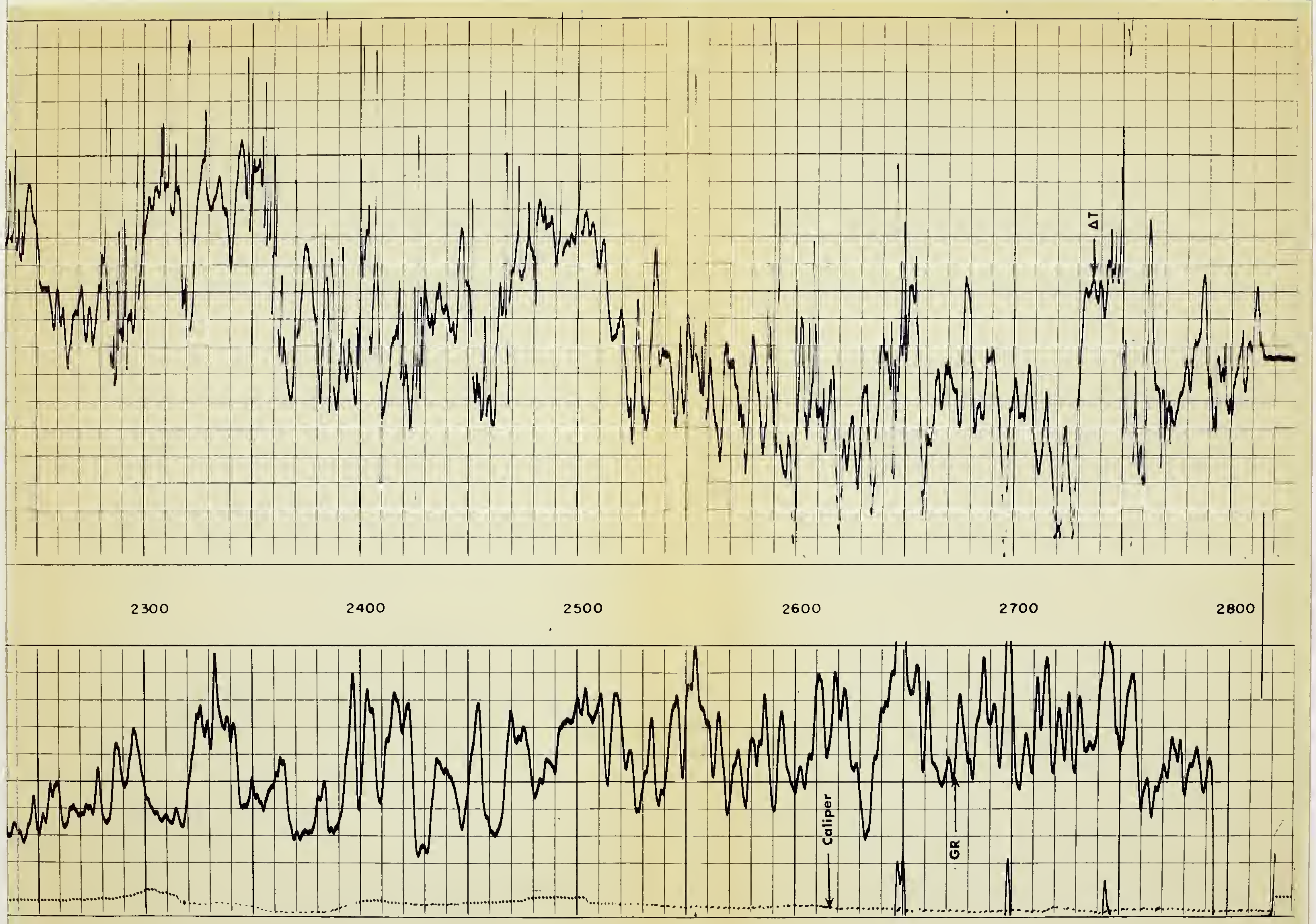
150 100 50
200 150

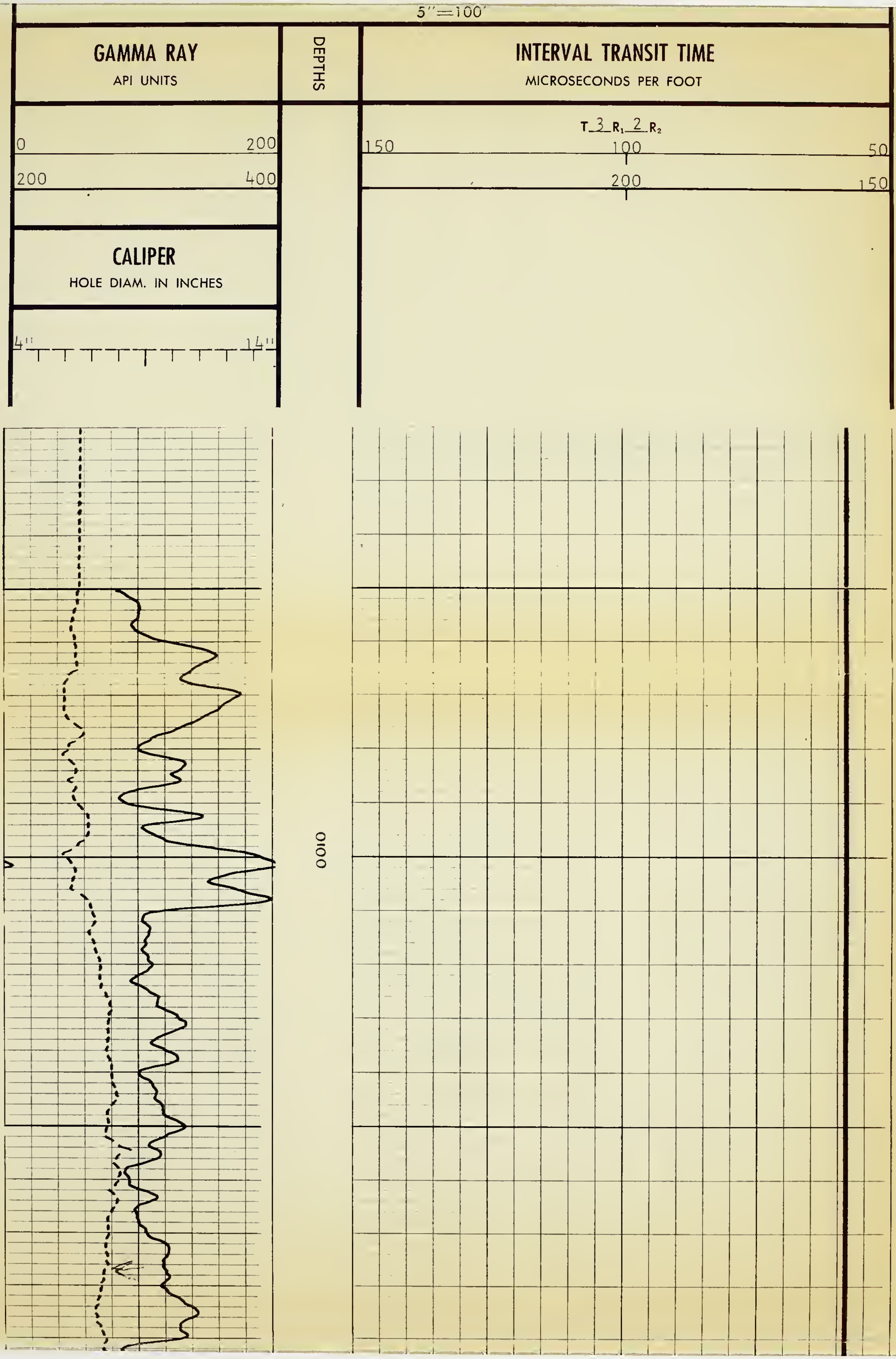



FLUID LEVEL
0400
0500
0600
0700
0800
0900

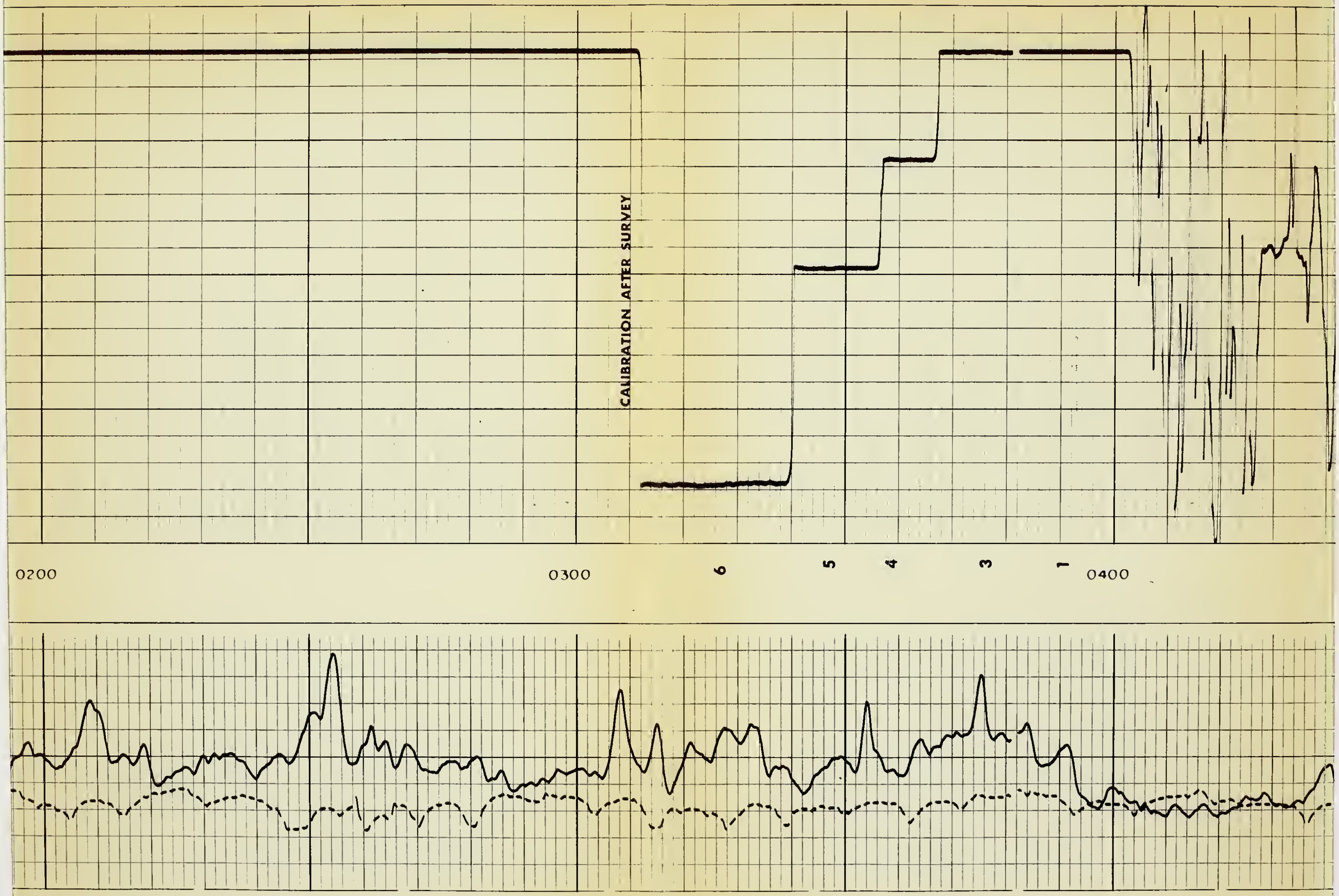

1000
1100
1200
1300
1400
1500
1600

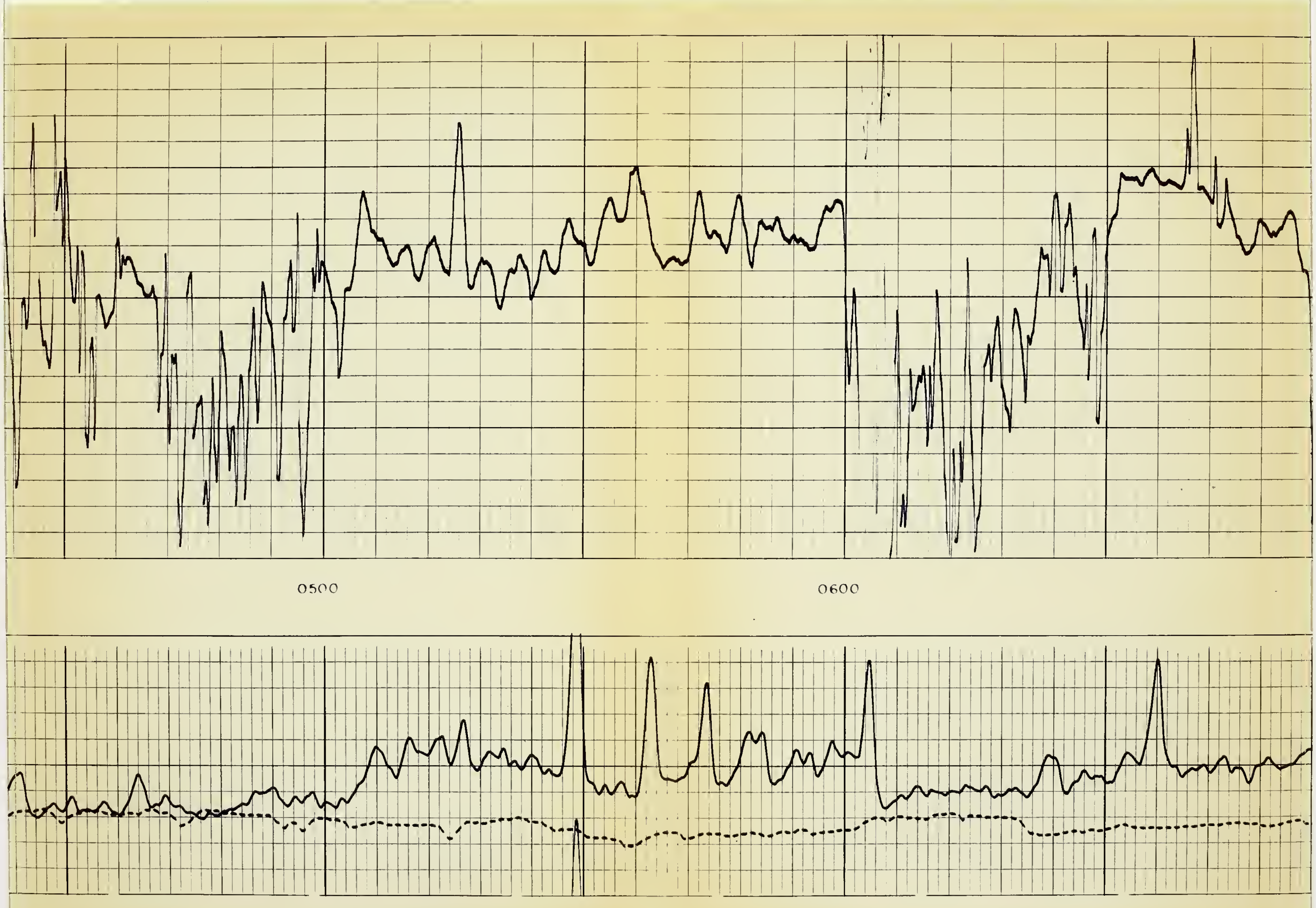

1700
1800
1900
2000
2100
2200

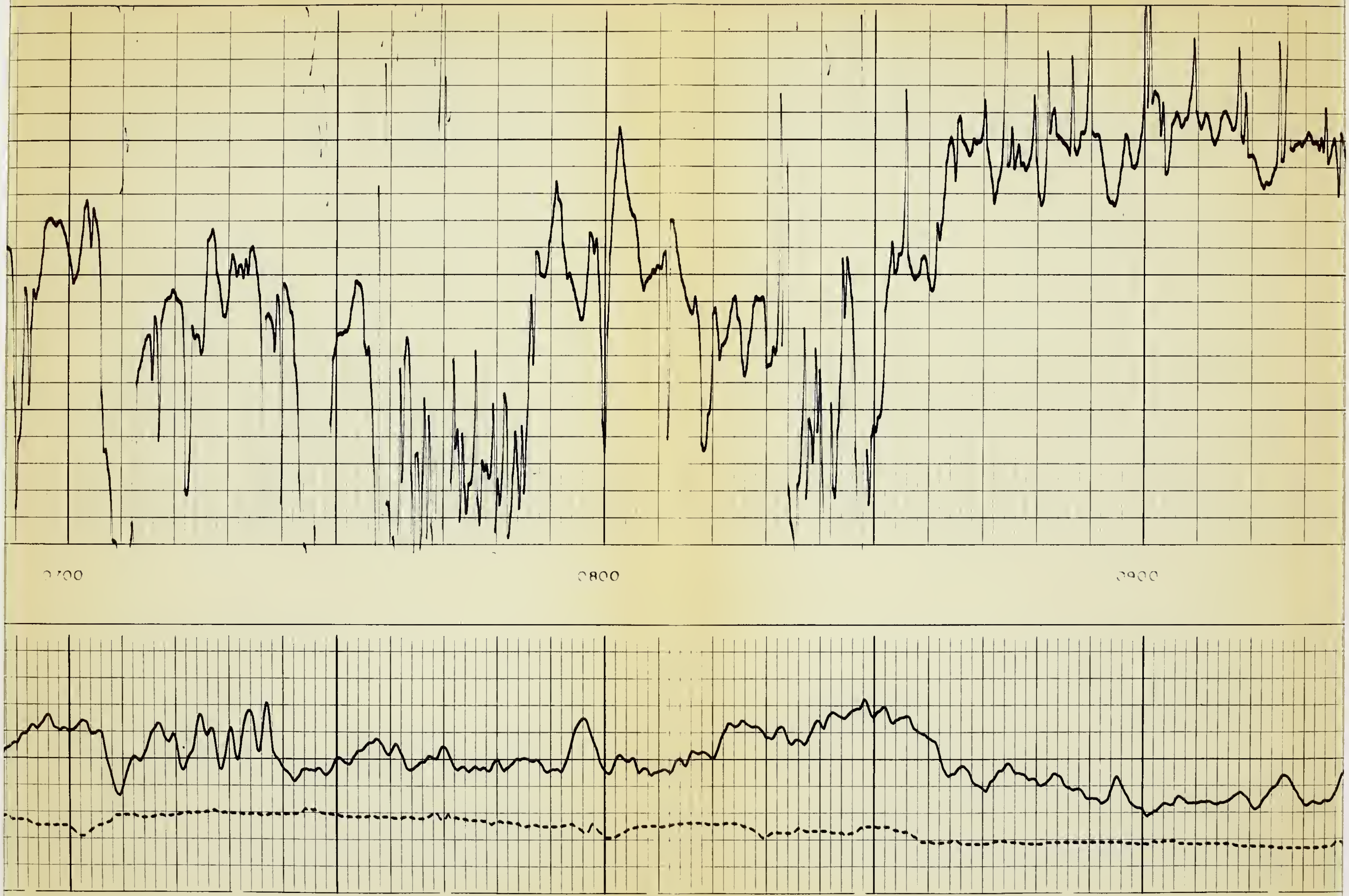

ΔT
2300
2400
2500
2600
2700
2800
Caliper
GR

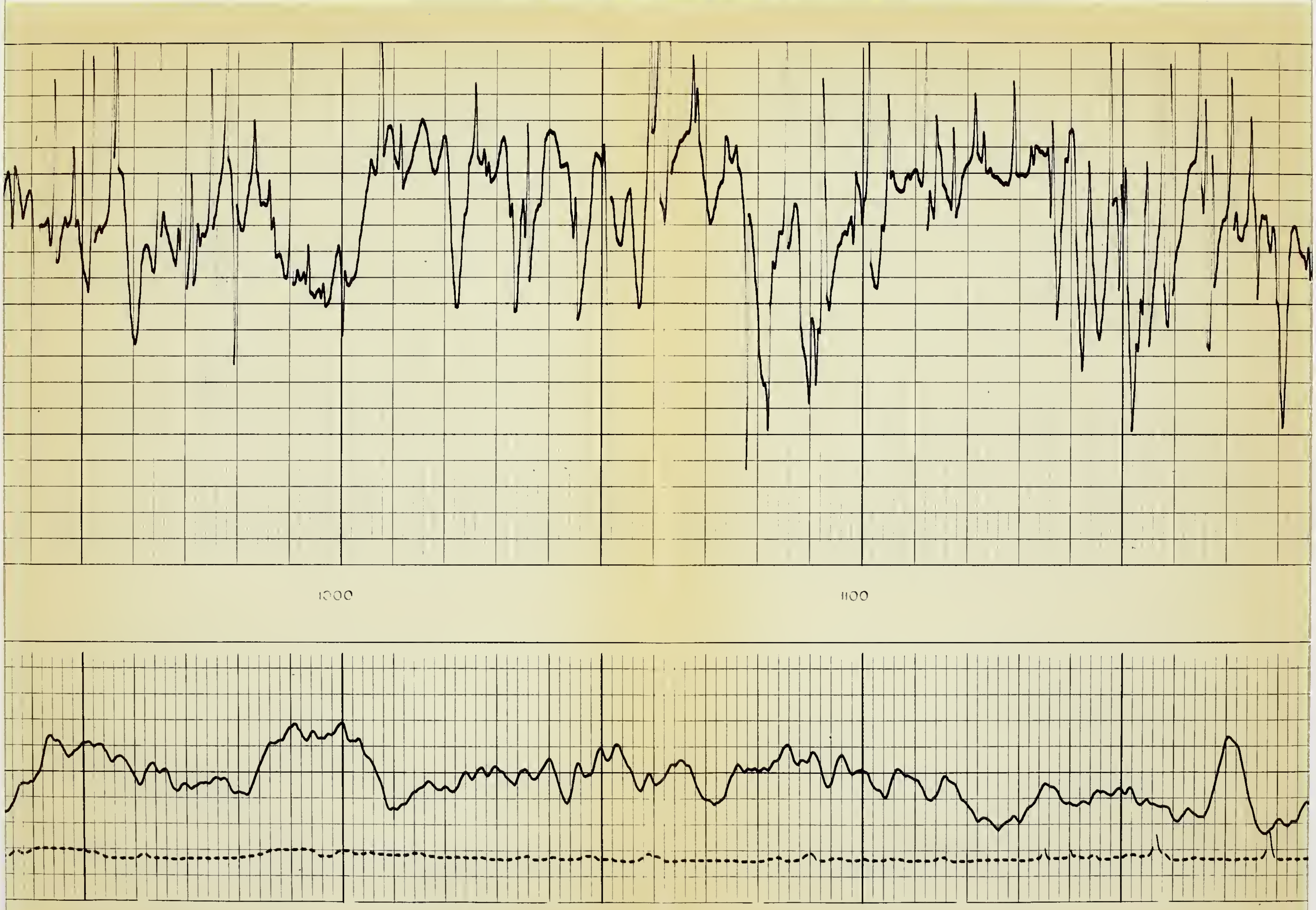


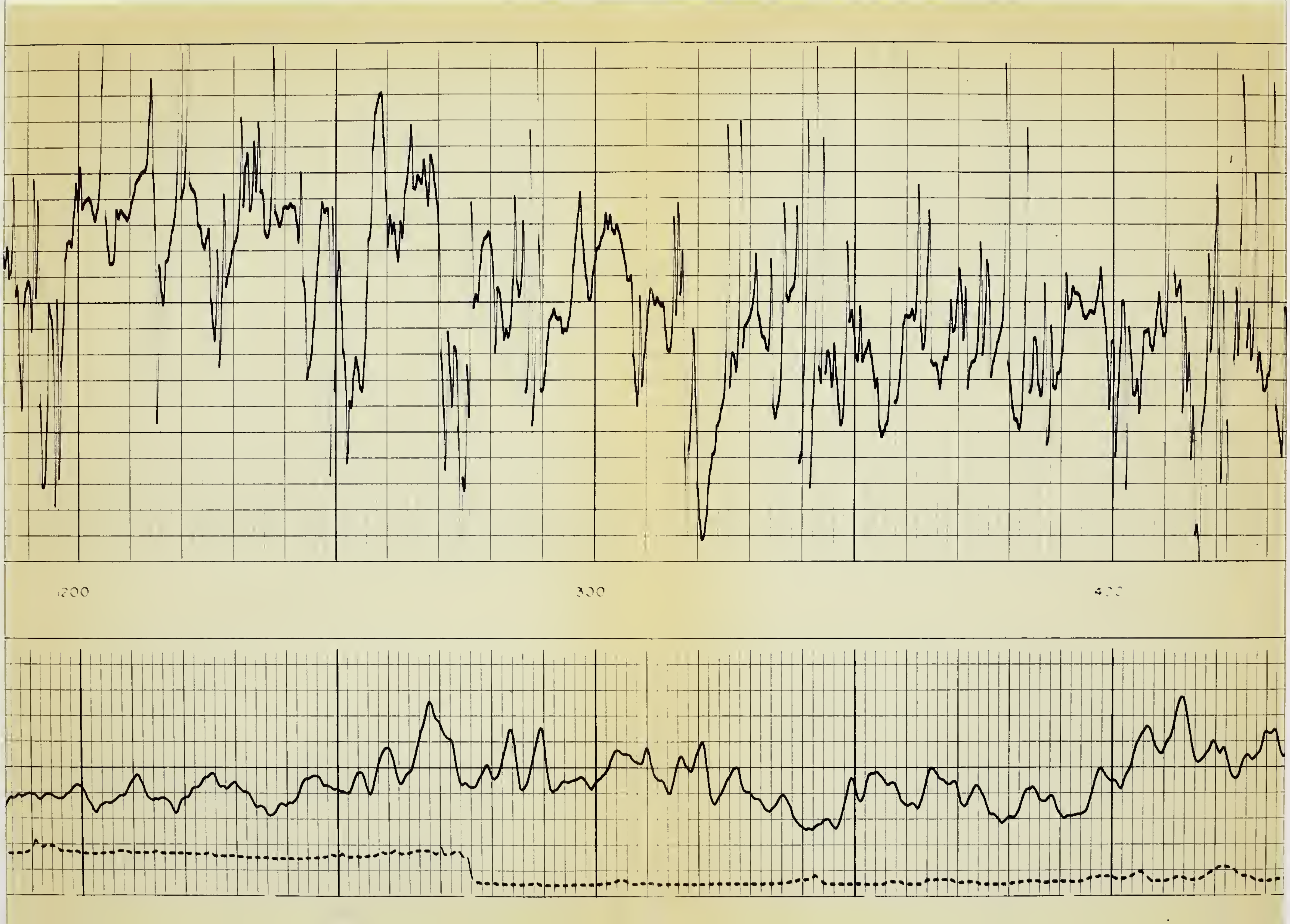
5″=100′
GAMMA RAY
API UNITS
0
200
200
400
CALIPER
HOLE DIAM. IN INCHES
4″
14″
DEPTHS
0100
INTERVAL TRANSIT TIME
MICROSECONDS PER FOOT
T 3 R₁ 2 R₂
150
100
50
200
150

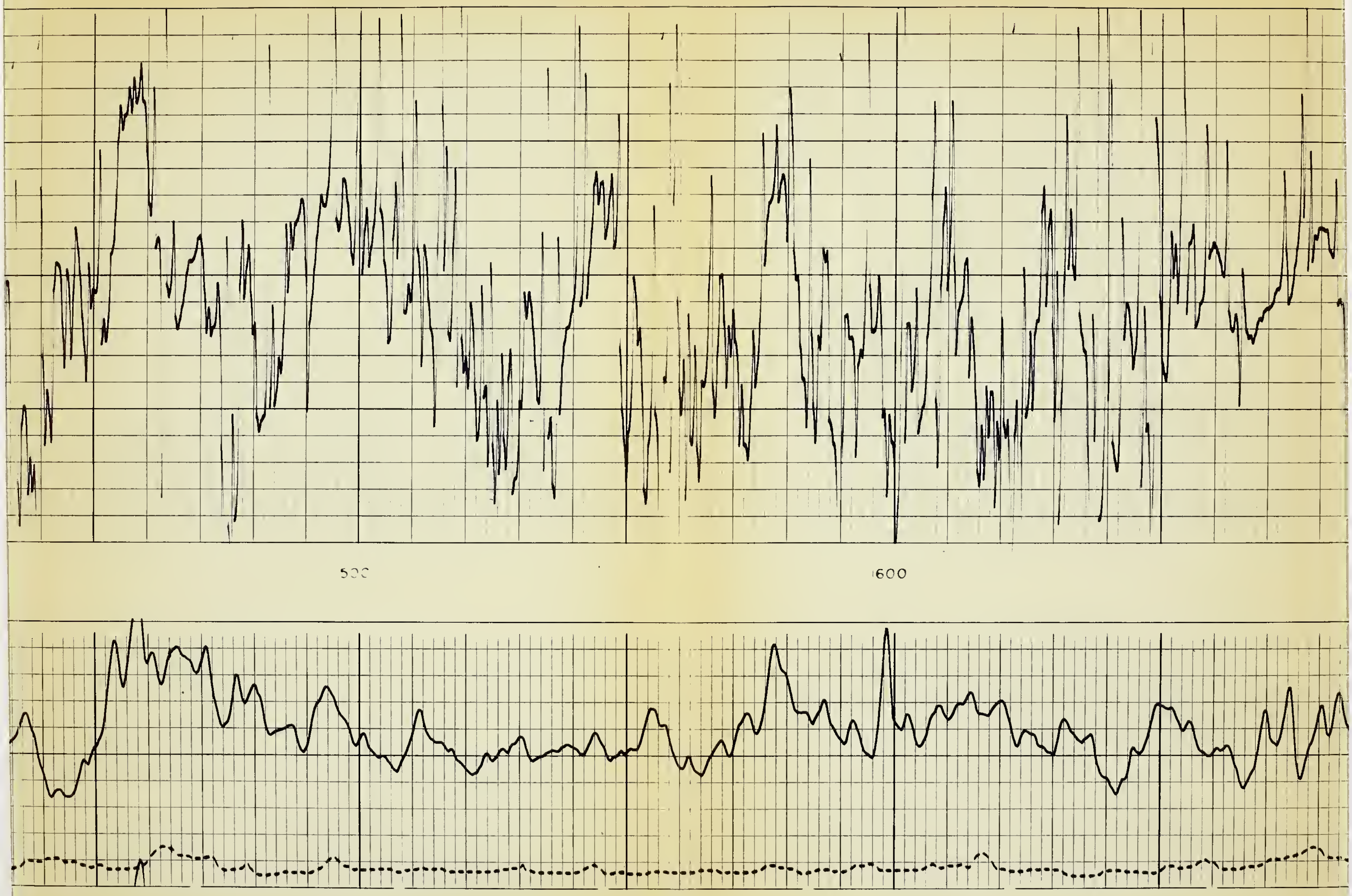

CALIBRATION AFTER SURVEY
0200
0300
6
5
4
3
1
0400

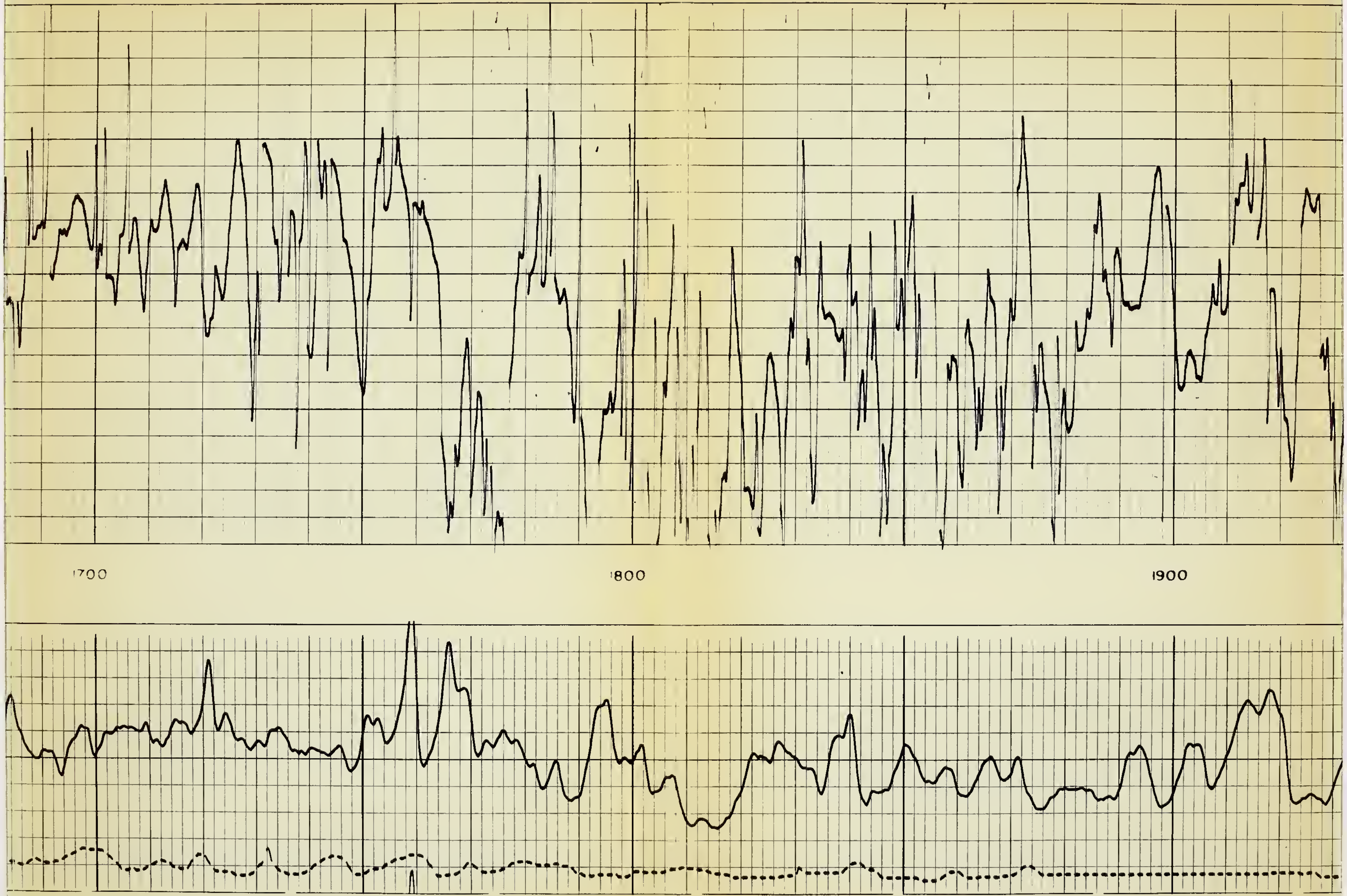

0500
0600

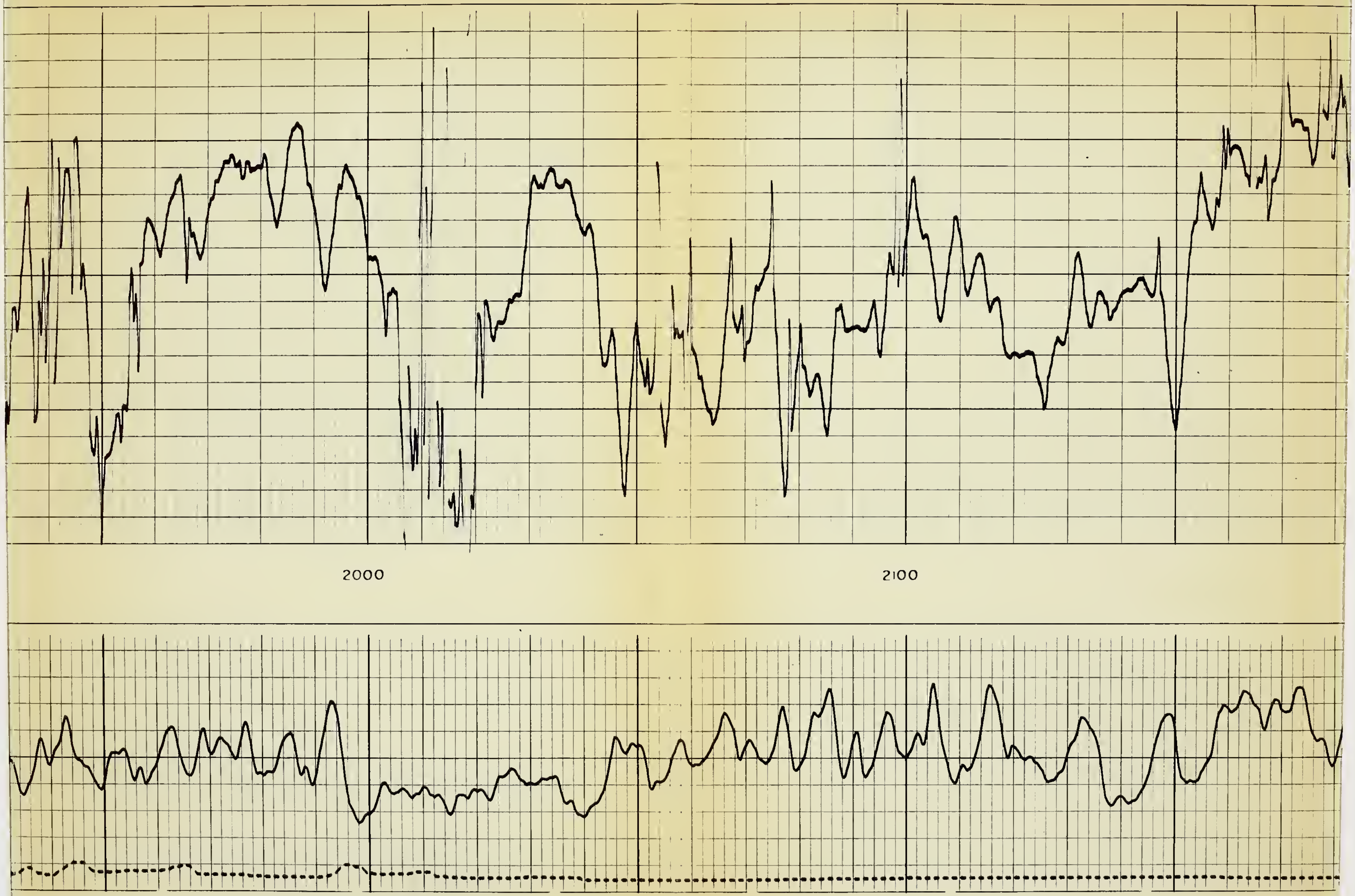

0700
0800
0900

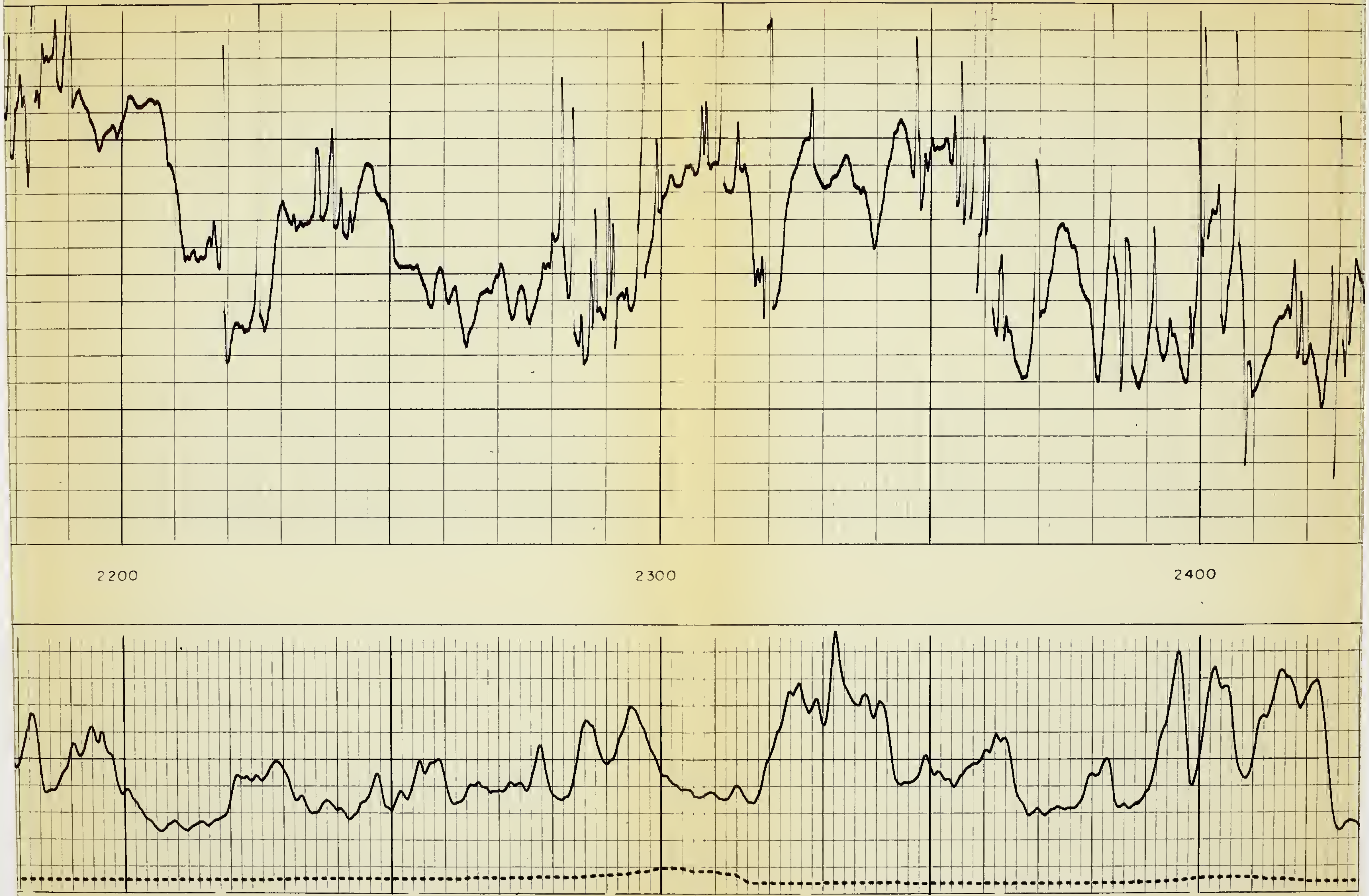

1000
1100

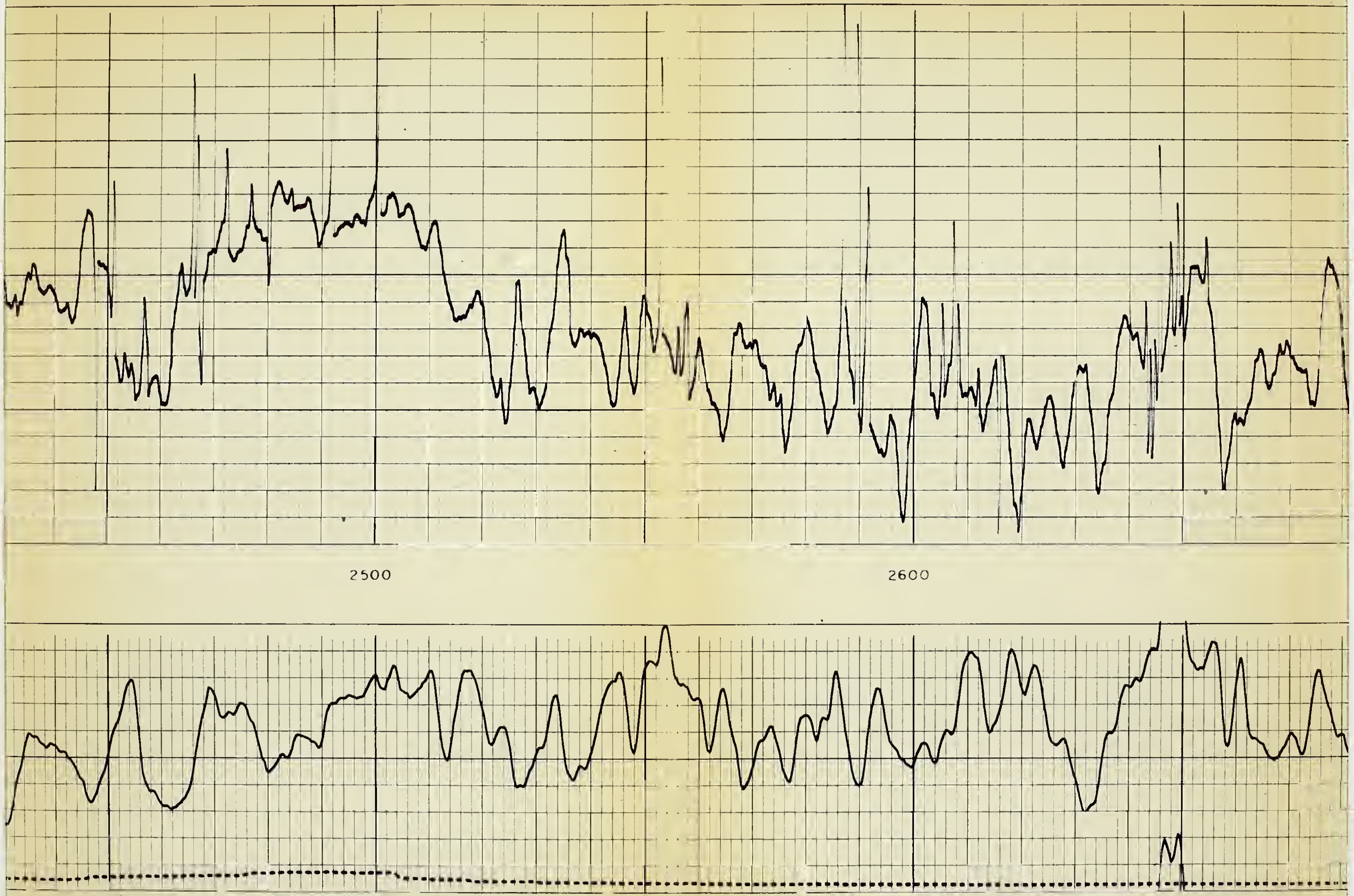

200
300
400

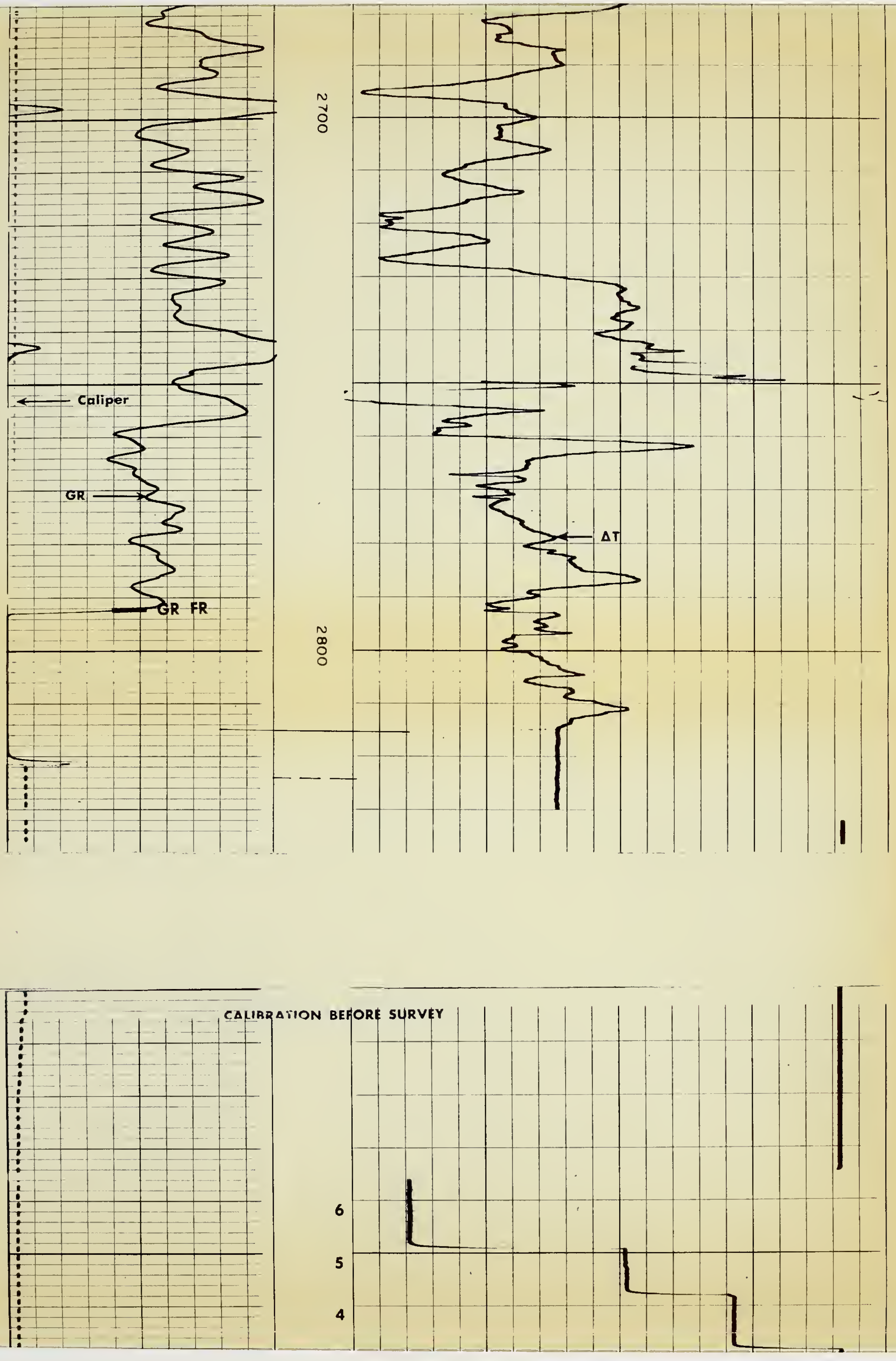

500
1600

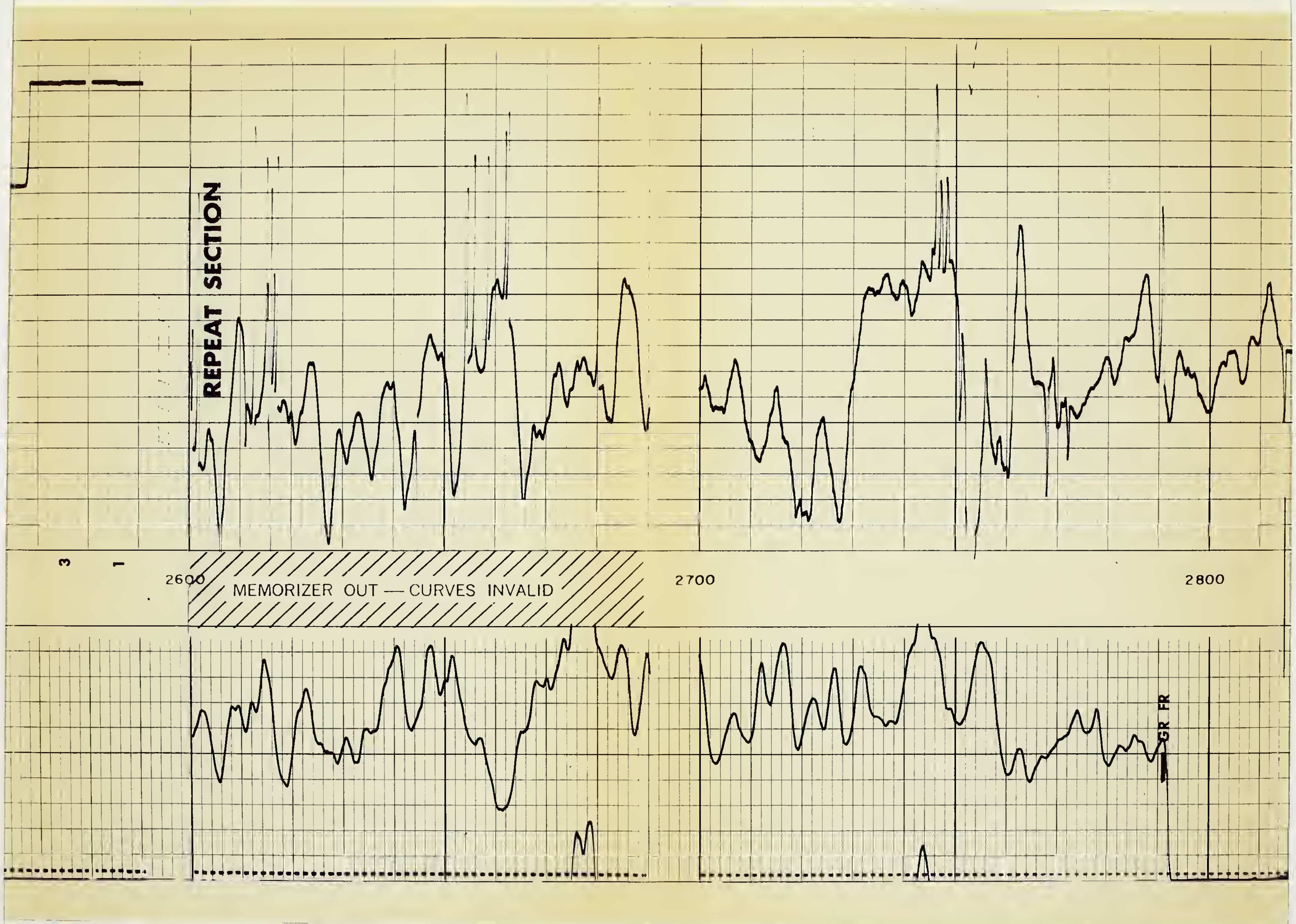

1700
1800
1900

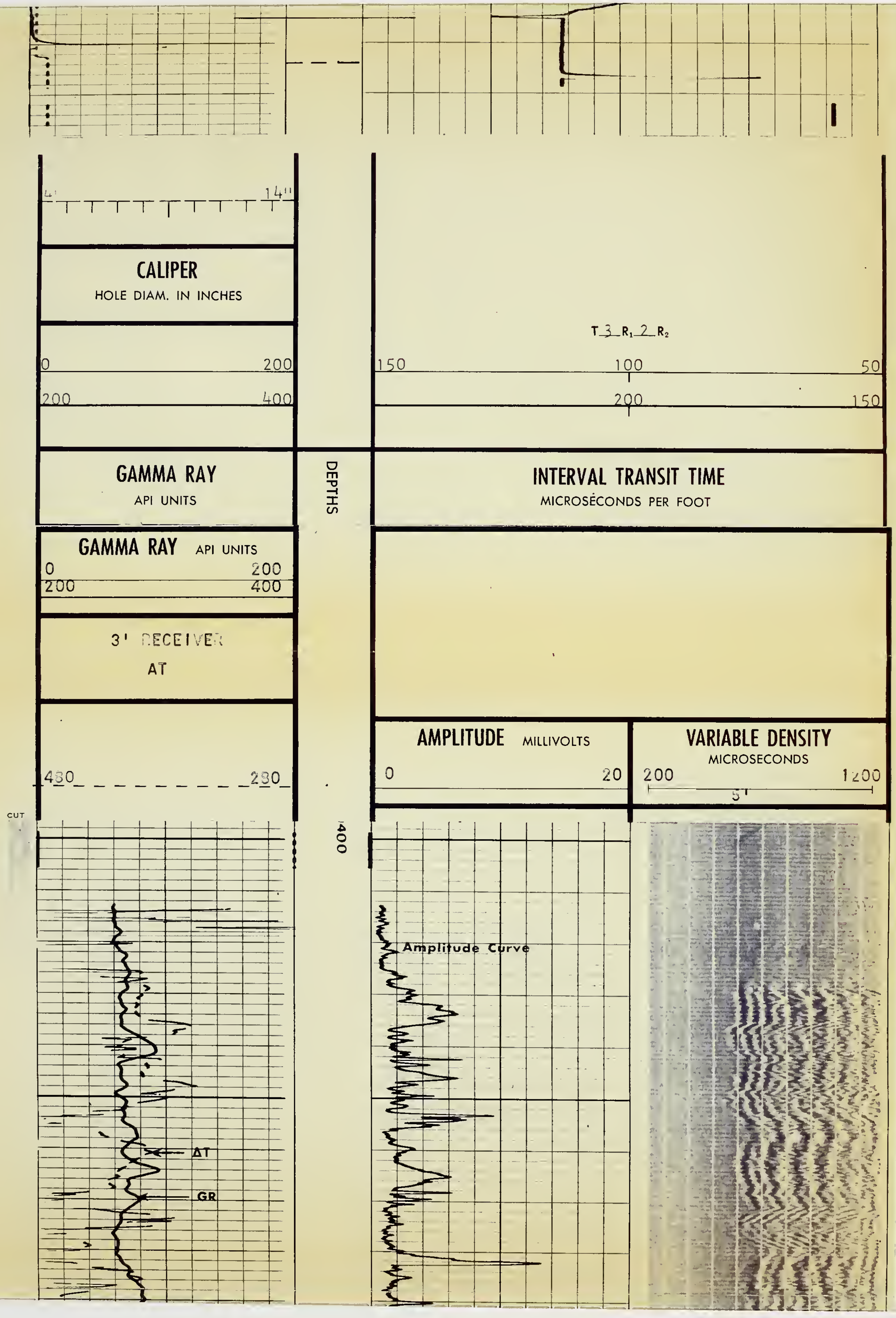

2000
2100

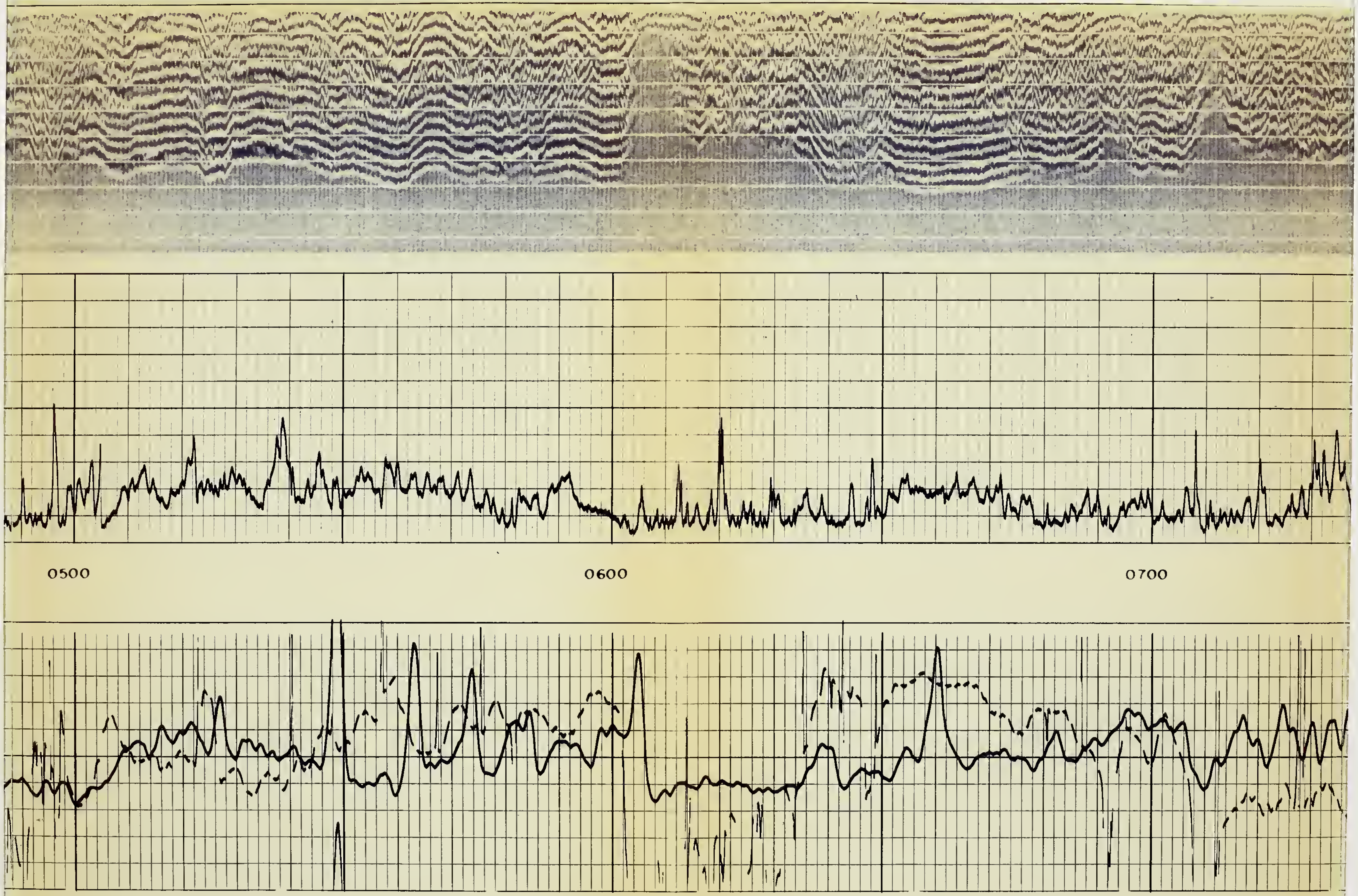

2200
2300
2400

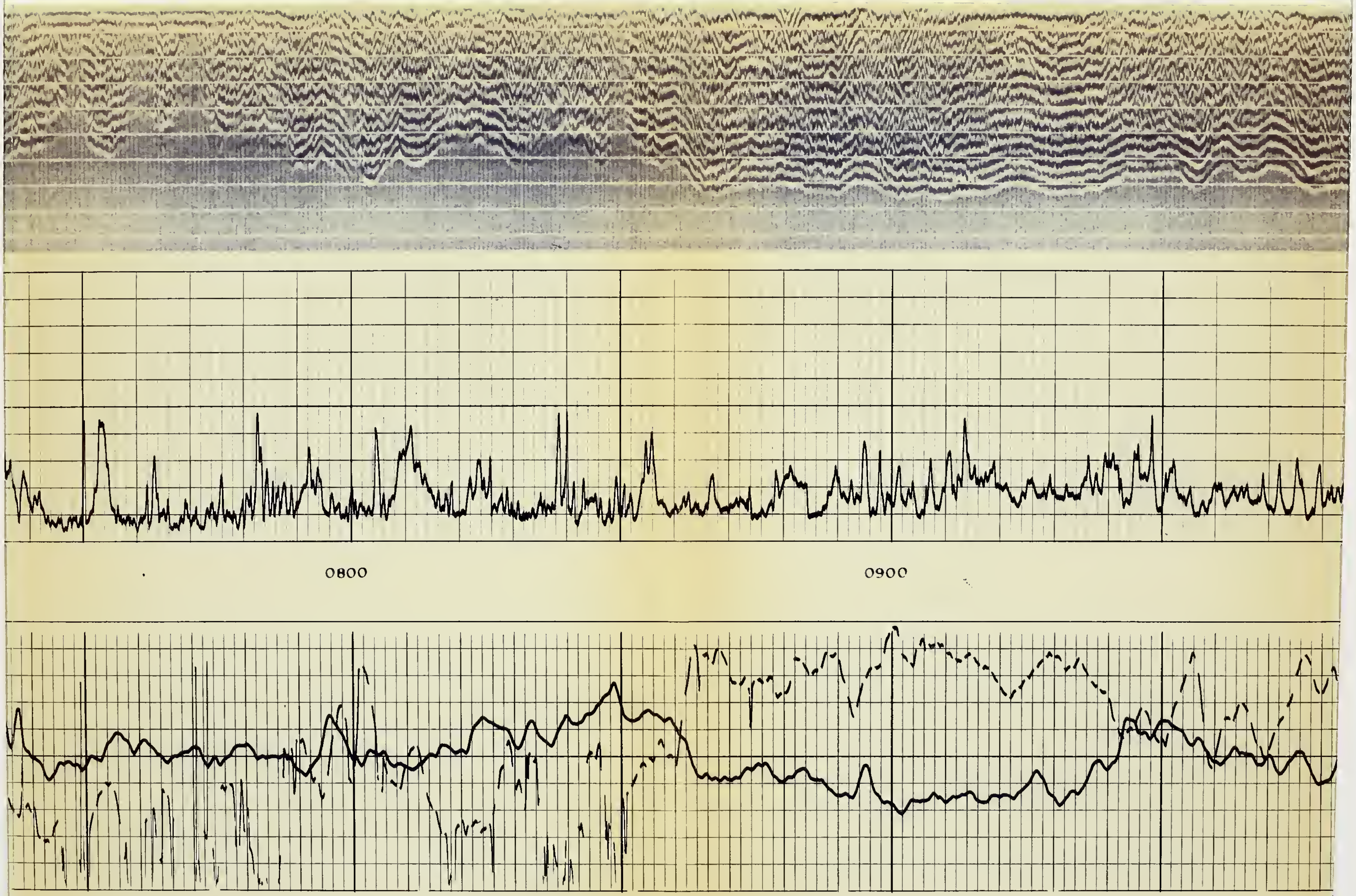

2500
2600

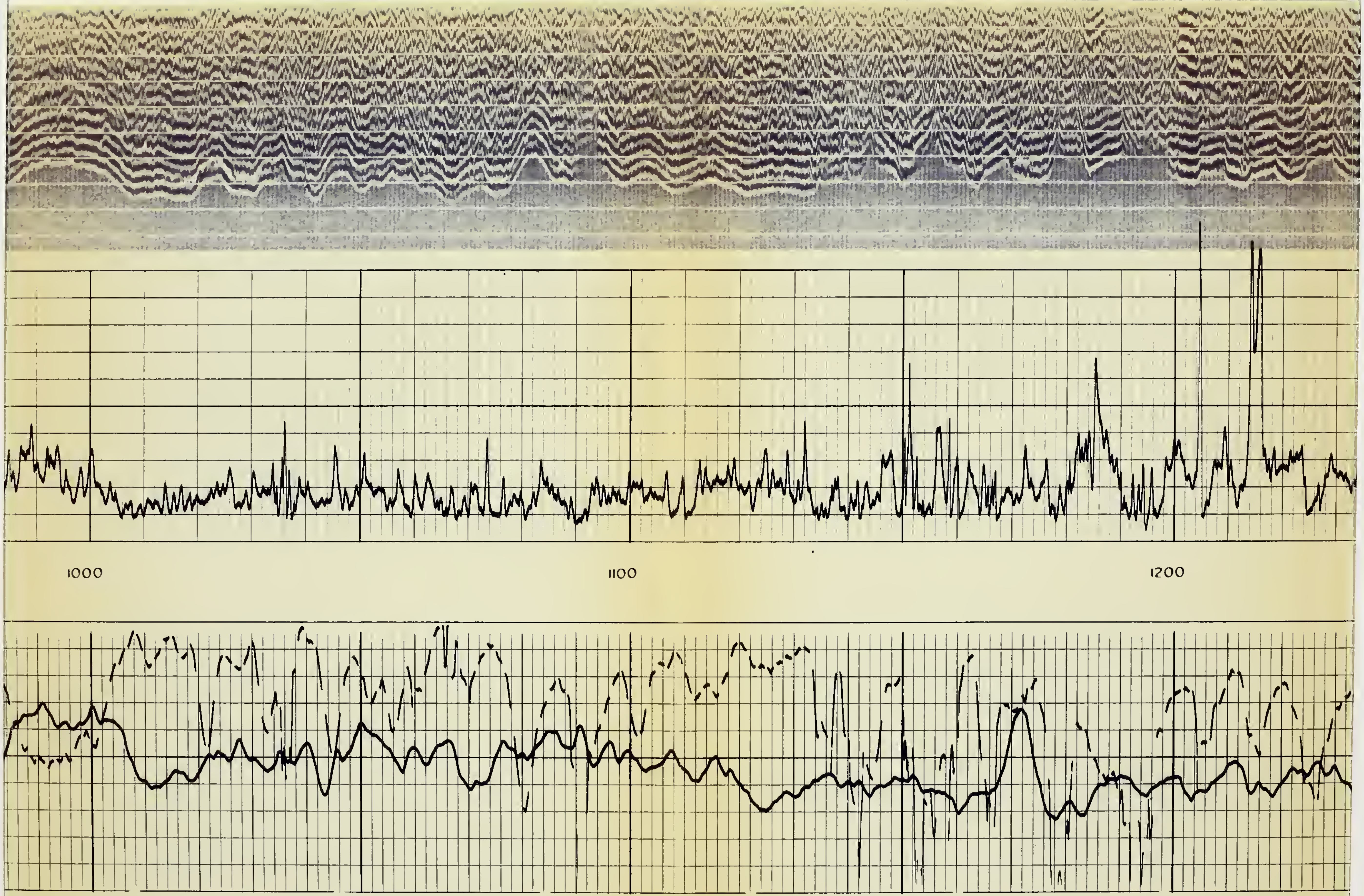

2700
2800
Caliper
GR
GR FR
ΔT
CALIBRATION BEFORE SURVEY
6
5
4

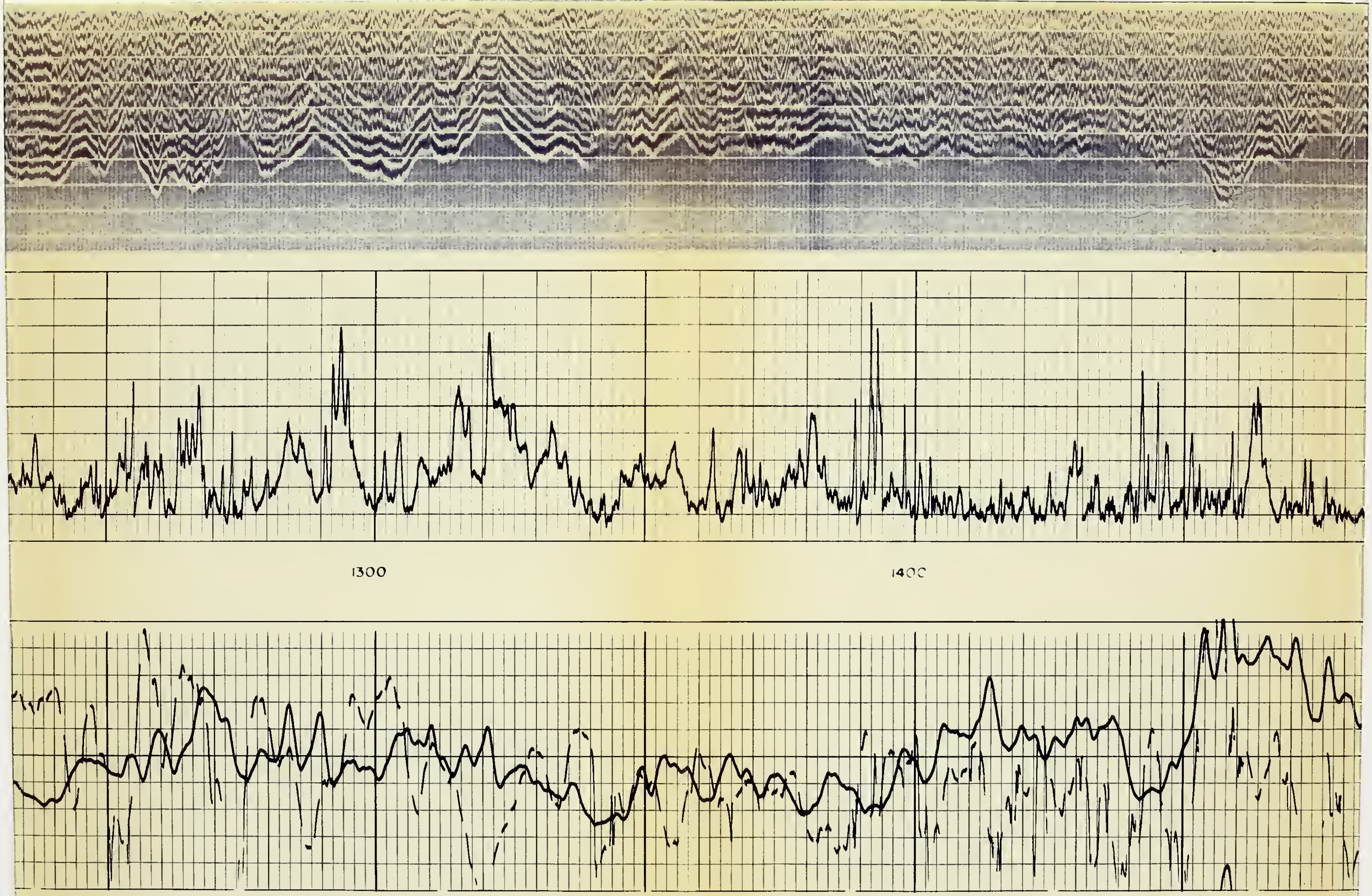

REPEAT SECTION
3
1
2600
MEMORIZER OUT — CURVES INVALID
2700
2800
GR FR

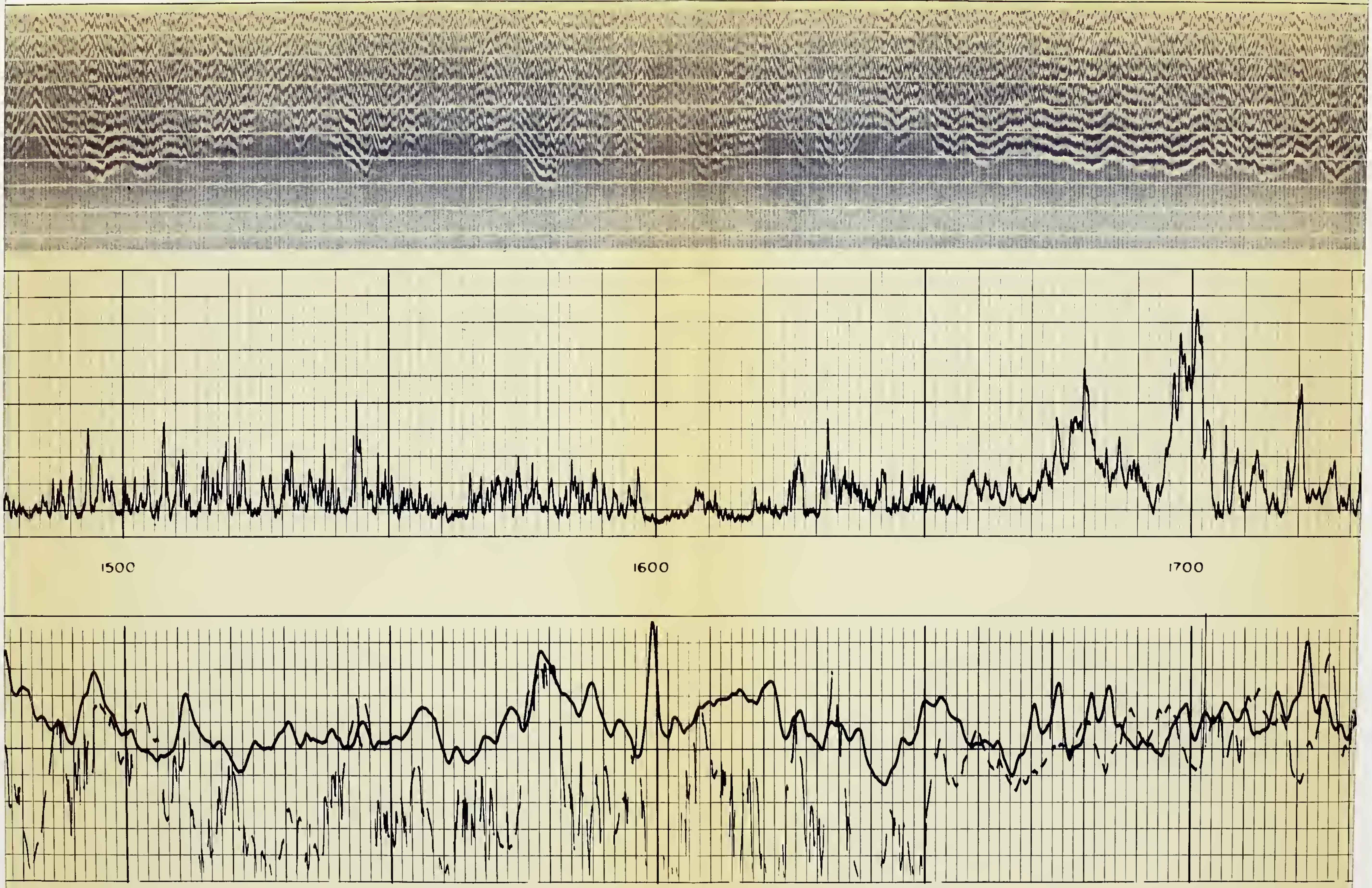

4"
14"
CALIPER
HOLE DIAM. IN INCHES
0
200
200
400
GAMMA RAY
API UNITS
GAMMA RAY API UNITS
0
200
200
400
3' RECEIVER
AT
480
280
CUT
DEPTHS
400
T 3 R1 2 R2
150
100
50
200
150
INTERVAL TRANSIT TIME
MICROSÉCONDS PER FOOT
AMPLITUDE MILLIVOLTS
0
20
VARIABLE DENSITY
MICROSECONDS
200
1200
5'
Amplitude Curve
ΔT
GR

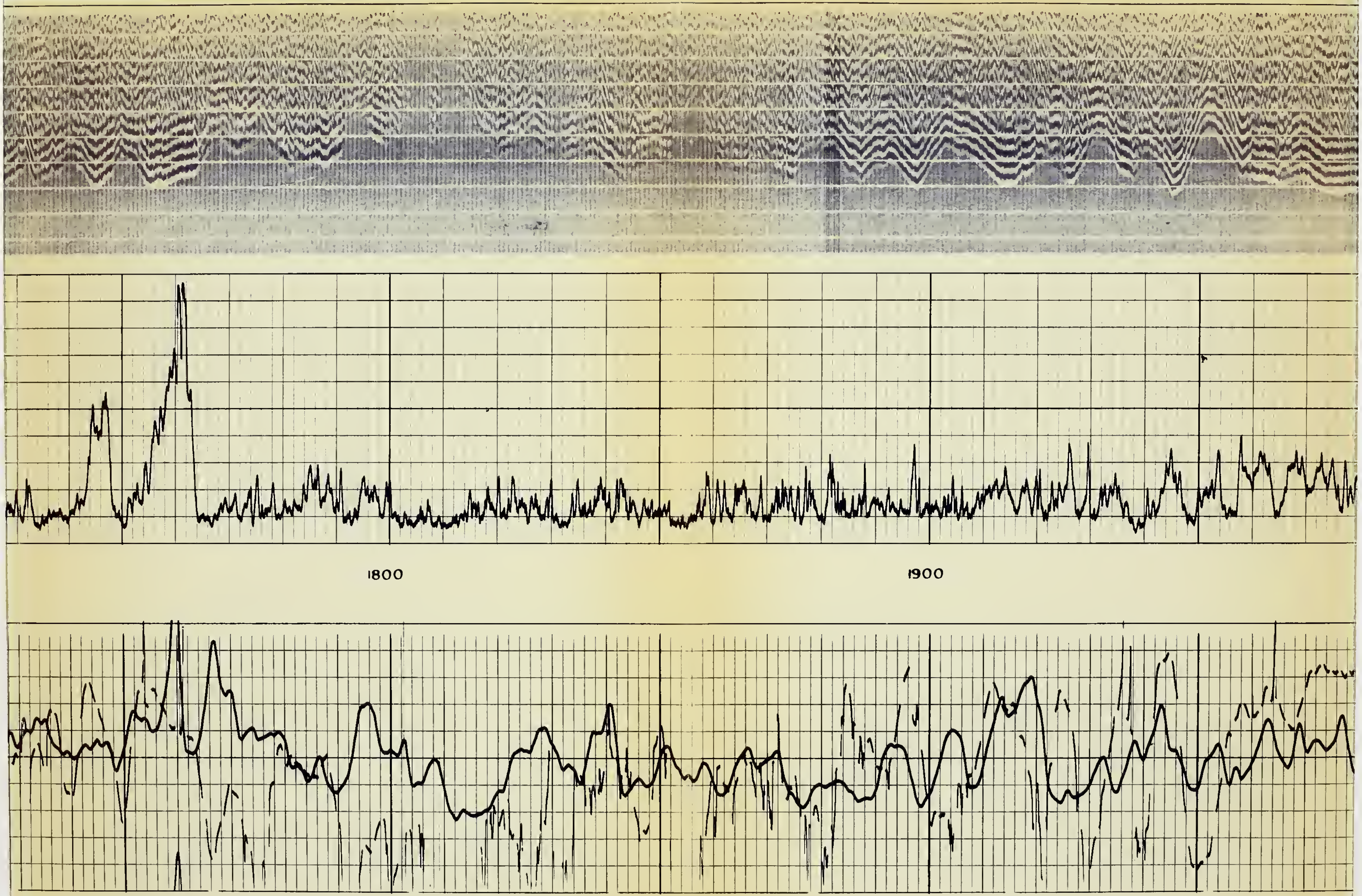

0500
0600
0700

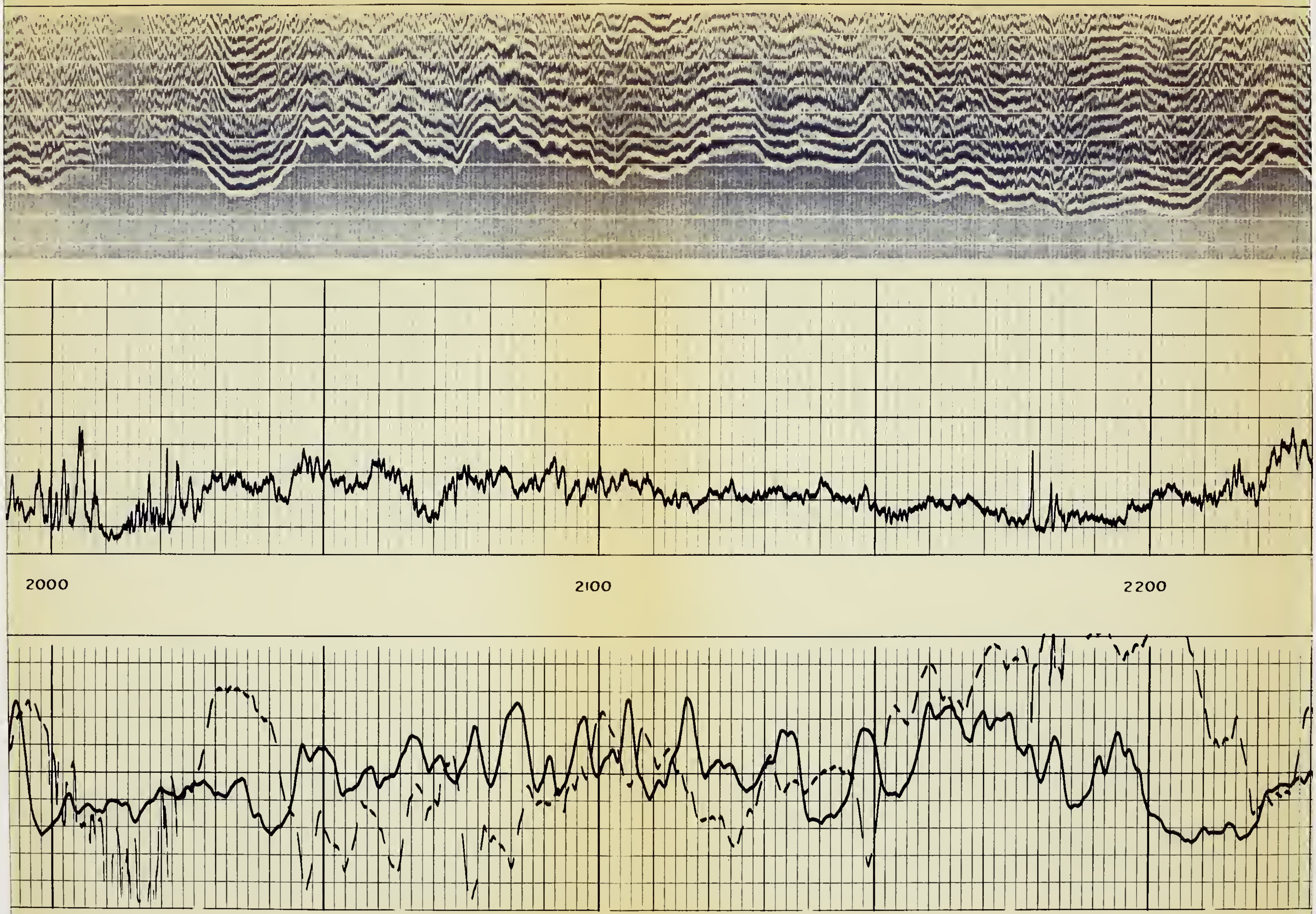

0800
0900

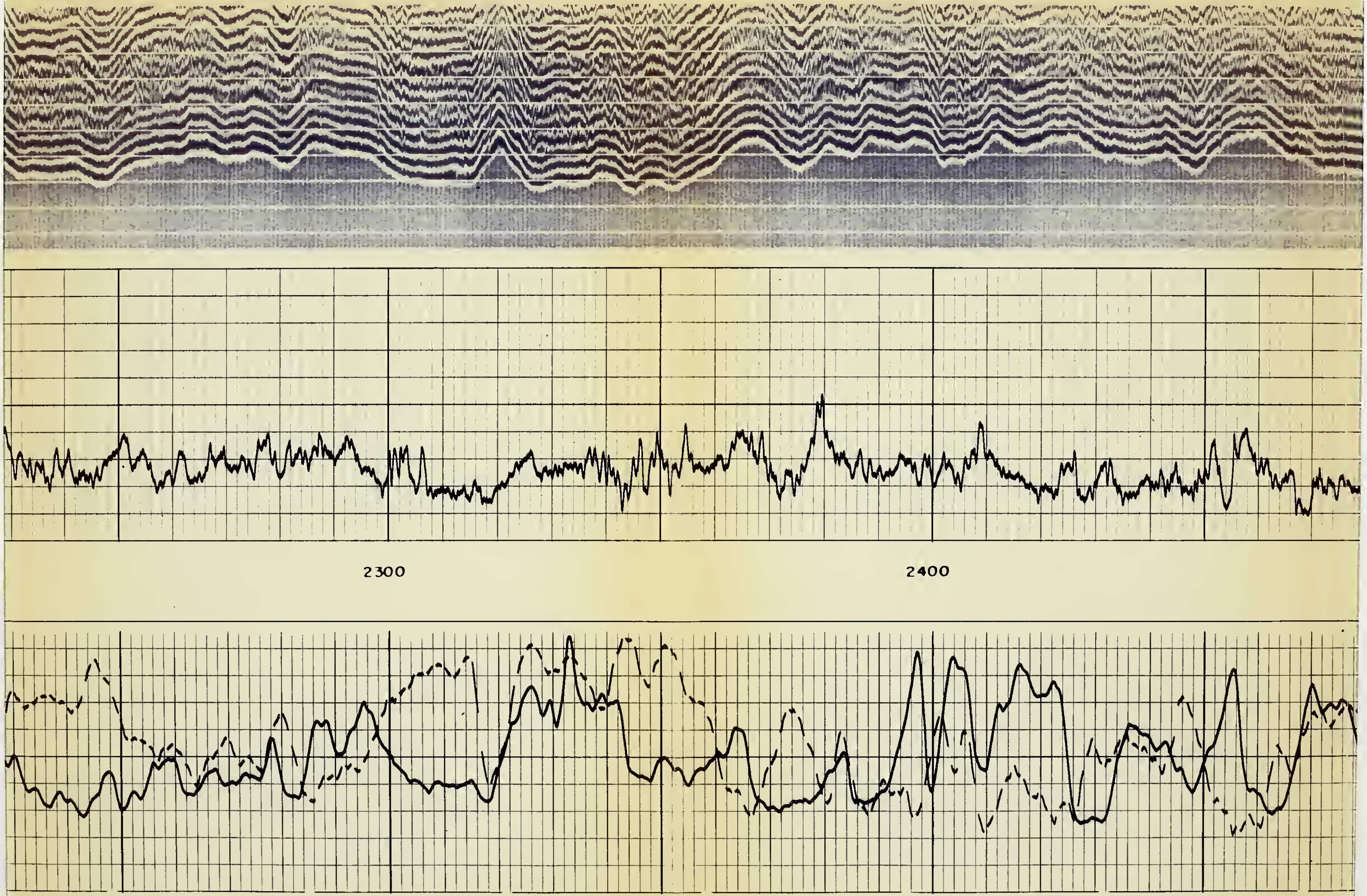

1000
1100
1200

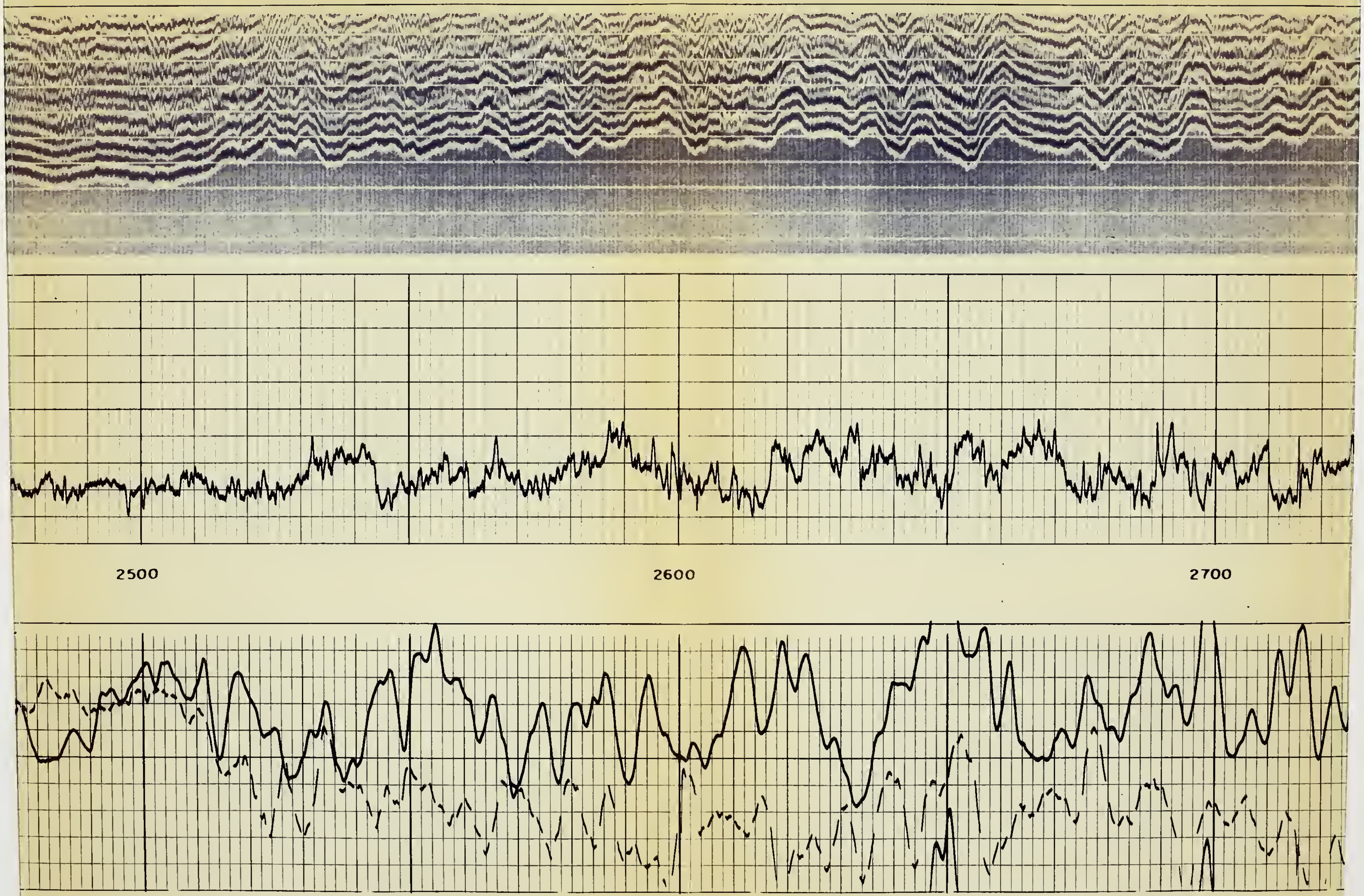

1300
1400

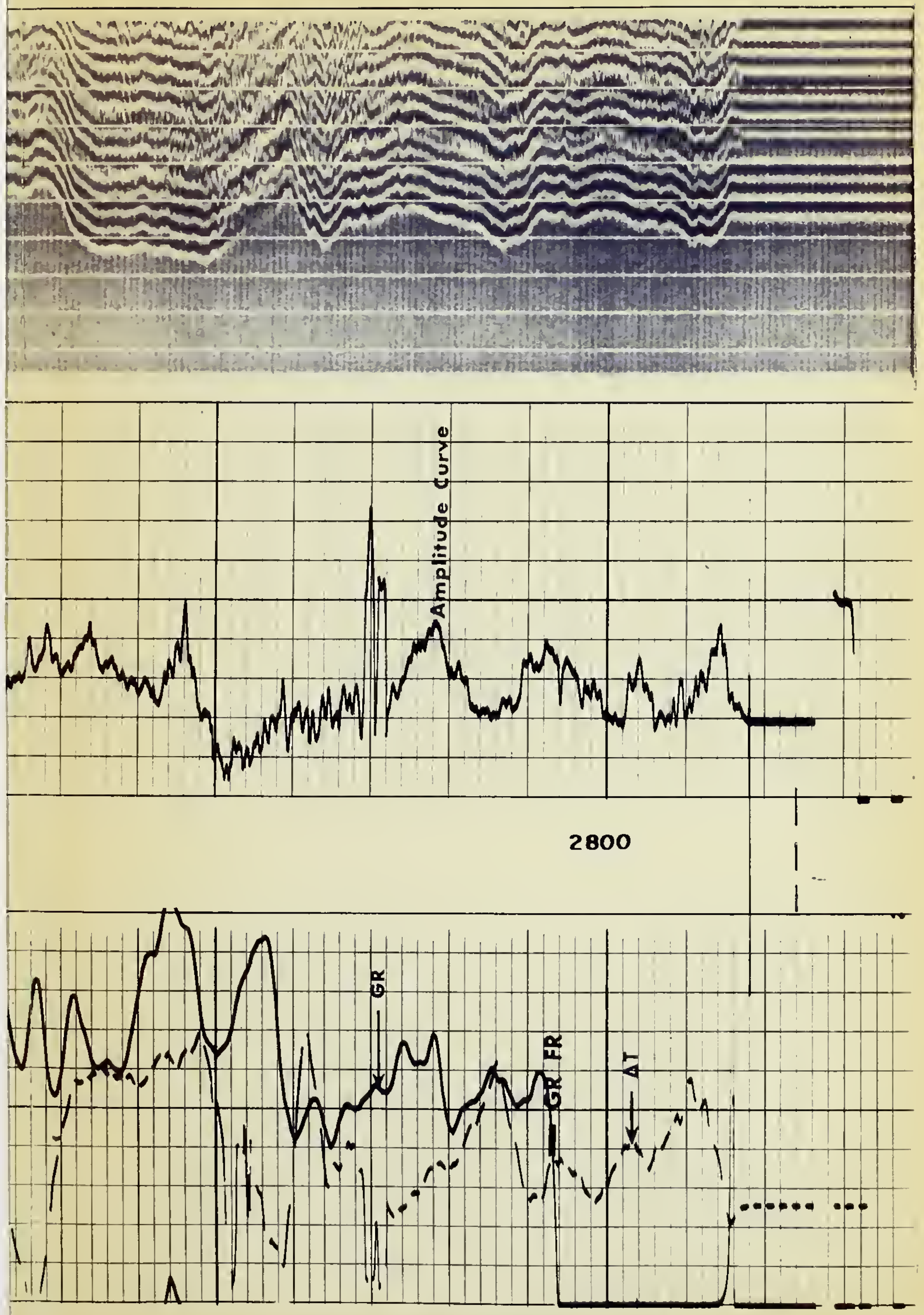

1500
1600
1700

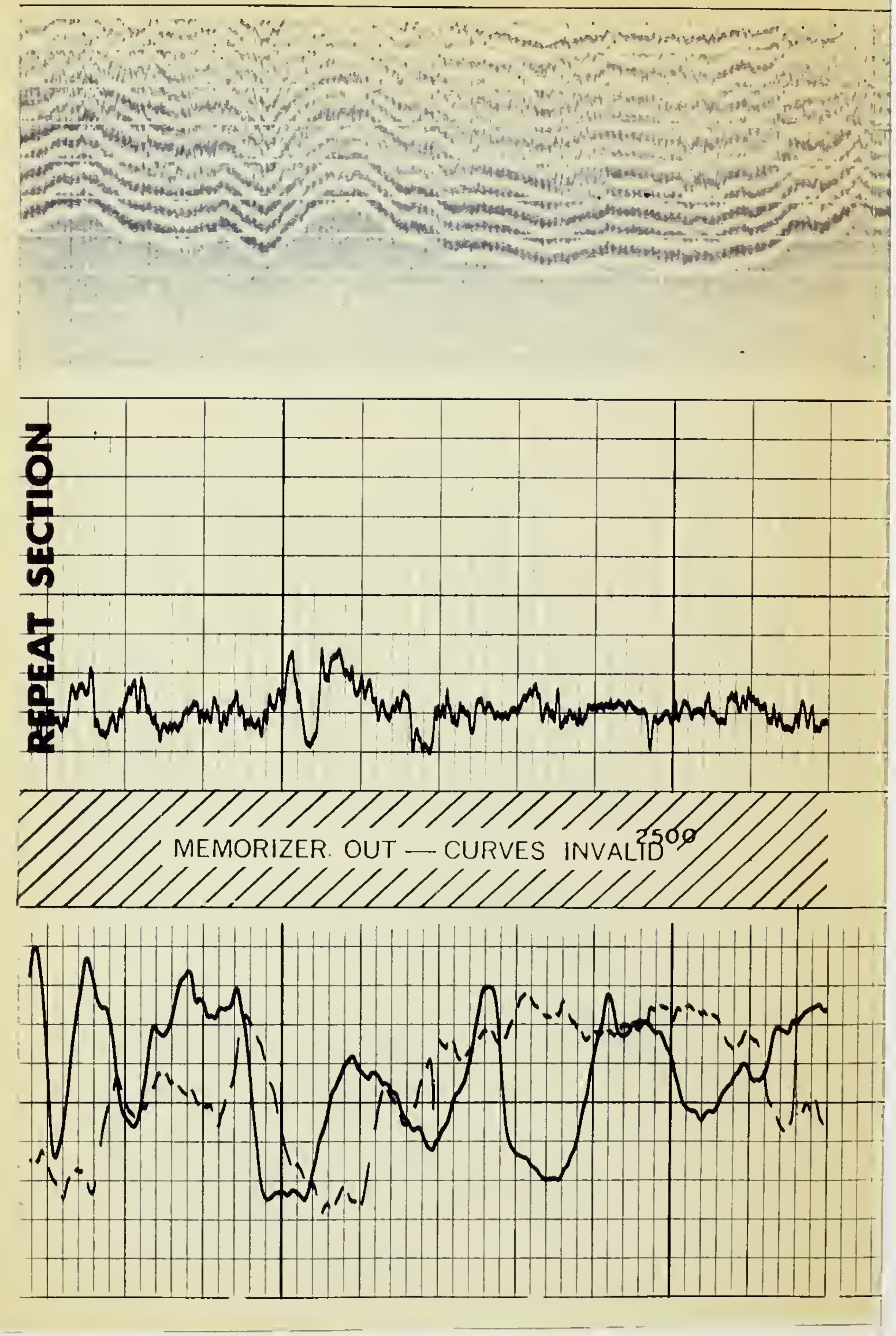

1800
1900

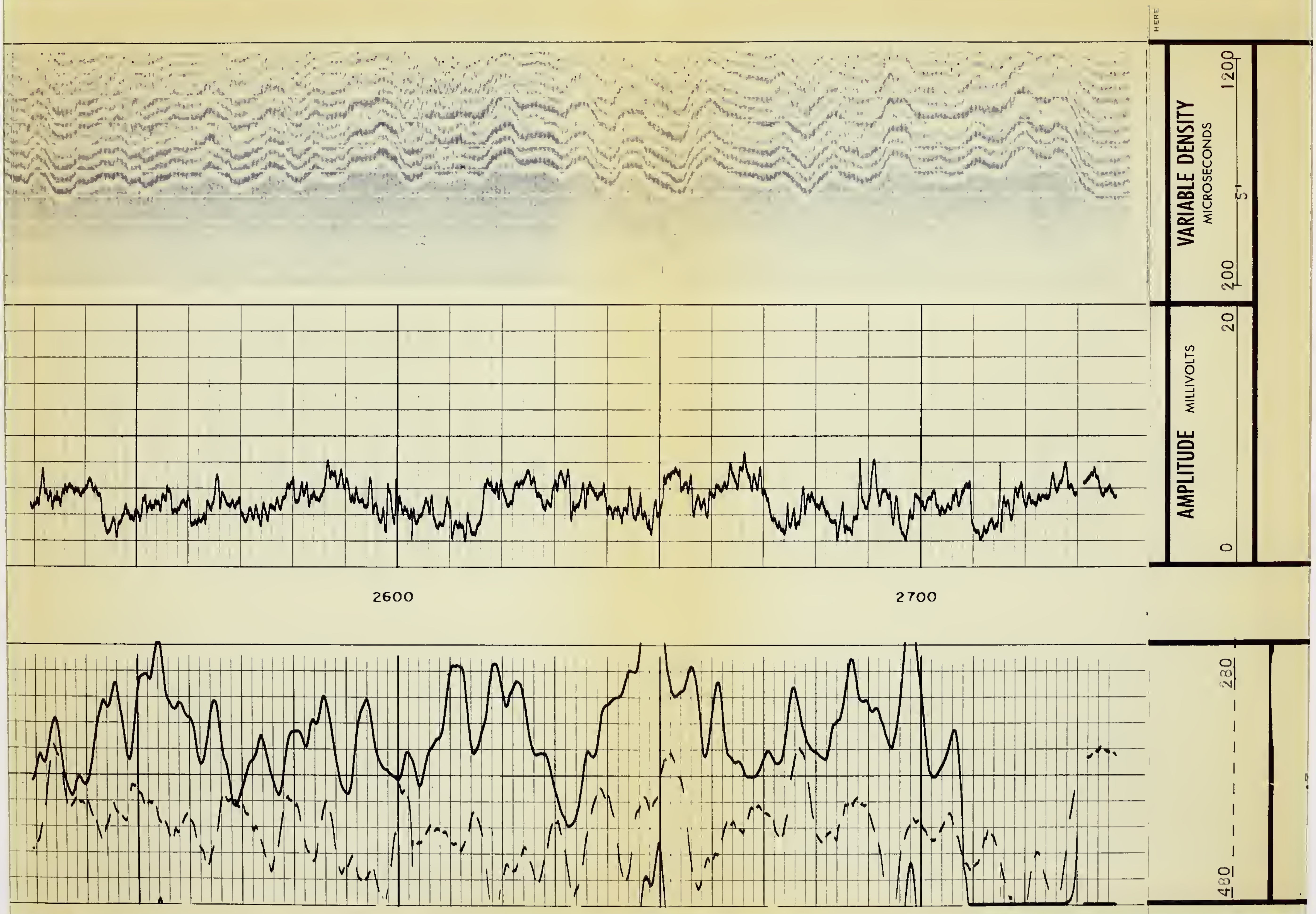

2000
2100
2200


2300
2400


2500
2600
2700


Amplitude Curve
2800
GR
GR FR
ΔT


REPEAT SECTION
MEMORIZER OUT — CURVES INVALID
2500


HERE
VARIABLE DENSITY
MICROSECONDS
200
5
1200
AMPLITUDE
MILLIVOLTS
0
20
2600
2700
280
480

AT
3' RECEIVER

GAMMA RAY API UNITS

0	200
200	400

COMPANY ATLANTIC RICHFIELD COMPANY

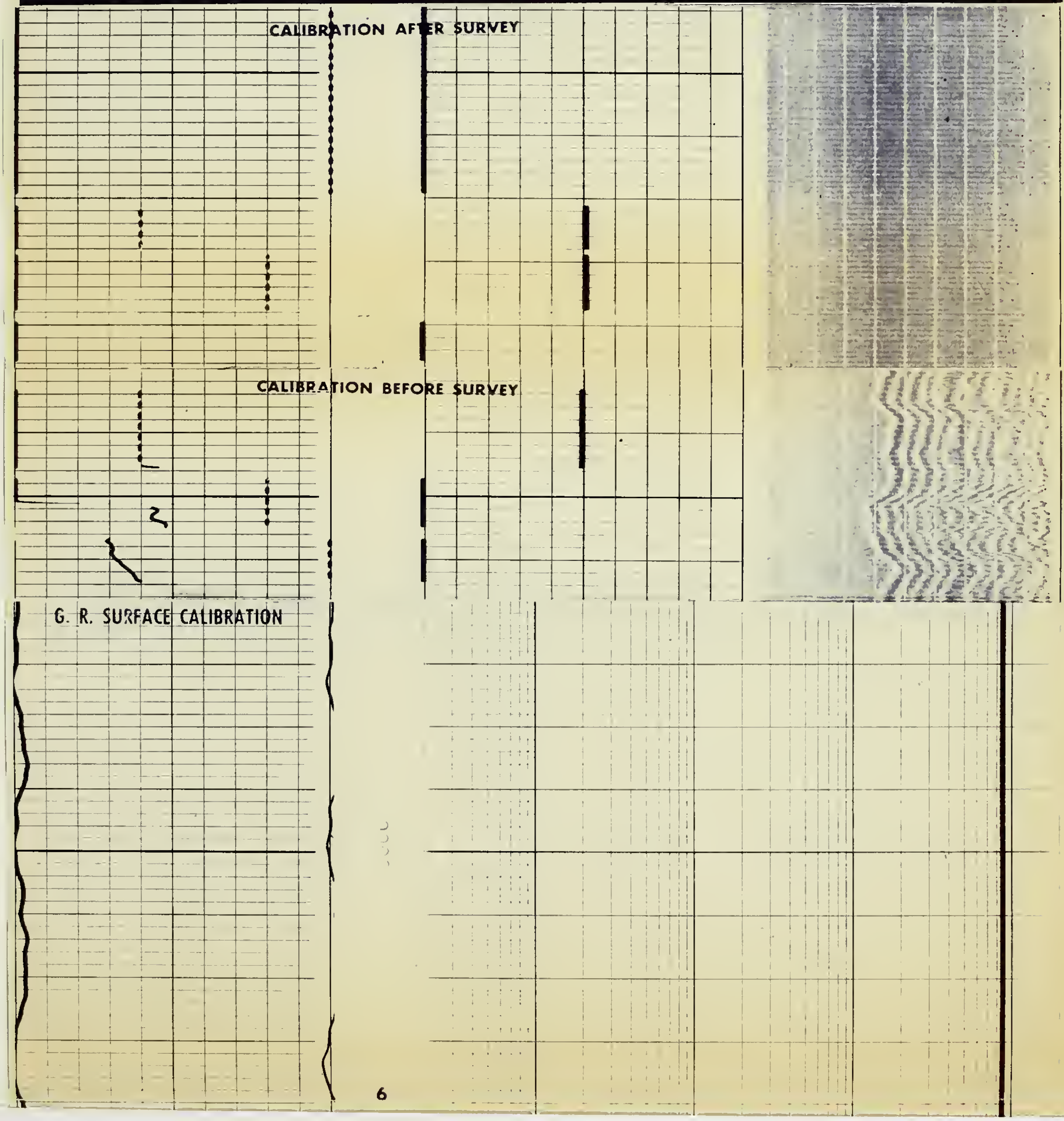
WELL SORGHUM GULCH -11

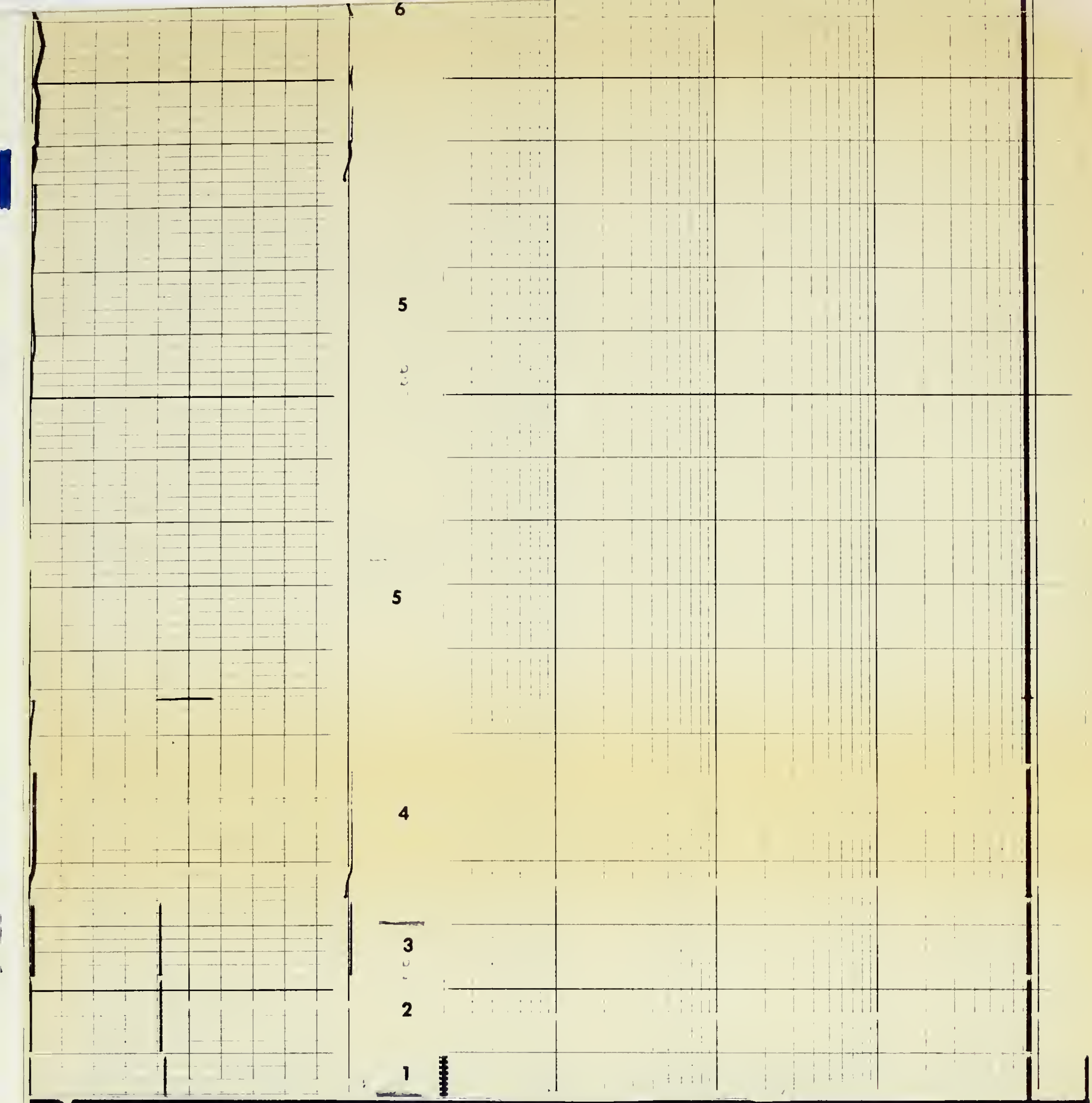
FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 2815
SCHL. TD 2824
DRLR TD 2826
Elev:
KB -
DF -
GL 6900

CALIBRATION RECORD





BOREHOLE COMPENSATED SONIC CALIBRATION CODING

1. MECHANICAL ZERO
2. 40 μ SEC/FT
3. 60 μ SEC/FT
4. 80 μ SEC/FT
5. 100 μ SEC/FT
6. 140 μ SEC/FT

GAMMA RAY CALIBRATION CODING

1. MECHANICAL ZERO
2. ELECTRICAL ZERO
3. RECORDER SENSITIVITY
4. MEMORIZER ADJUSTMENT
5. BACKGROUND
6. CALIBRATION

CALIBRATION RECORD

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #11

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 2815
SCHL. TD 2824
DRLR TD 2826
Elev:
KB -
DF -
GL 6900

Schlumberger

DUAL LATEROLOG

COUNTY RIO BLANCO
FIELD or LOCATION SORGHUM GULCH
WELL SORGHUM GULCH #11
COMPANY ATLANTIC RICHFIELD

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #11

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

LOCATION: 12' NSL & 160' WEL
API Serial No.
Sec. 7 Twp. 3S Rge. 96W

Other Services:
TEMP
BHC-GR
L-9

Permanent Datum: G.L., Elev. 6900
Log Measured From G.L. 0 Ft. Above Perm. Datum
Drilling Measured From G.L.

Elev.: K.B.
D.F.
G.L. 6900

Date	9-3-74			
Run No.	ONE			
Depth—Driller	2826	-		
Depth—Logger	2830			
Btm. Log Interval	2818			
Top Log Interval	393			
Casing—Driller	8 5/8 @ 62	@	@	@
Casing—Logger	-			
Bit Size	6 1/4 TO 1283	4 7/8 TO TD		
Type Fluid in Hole	WATER			
Dens. | Visc.	- | -	|	|	|
pH | Fluid Loss	- | - ml	| ml	| ml	| ml
Source of Sample	MUDPIT			
R_m @ Meas. Temp.	3.52 @ 87 °F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	- @ °F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	- @ °F	@ °F	@ °F	@ °F
Source: R_{mf} | R_{mc}	- - |	|	|	|
R_m @ BHT	2.42 @ 127 °F	@ °F	@ °F	@ °F
Time Since Circ.	2 DAYS			
Max. Rec. Temp.	127 °F	°F	°F	°F
Equip. | Location	5639 | VRNL	|	|	|
Recorded By	ED MIXA			
Witnessed By	BERKHEISER			

FOLD HERE The well name, location and borehole reference data were furnished by the customer.

CHANGES IN MUD TYPE OR ADDITIONAL SAMPLES

Date | Sample No.		
Depth - Driller		
Type Fluid in Hole		
Dens. | Visc.		
ph | Fluid Loss	ml	ml
Source of Sample		
R_m @ Meas. Temp.	@ °F	@ °F
R_{mf} @ Meas. Temp.	@ °F	@ °F
R_{mc} @ Meas. Temp.	@ °F	@ °F
Source: R_{mf} | R_{mc}		
R_m @ BHT	@ °F	@ °F
R_{mf} @ BHT	@ °F	@ °F
R_{mc} @ BHT	@ °F	@ °F

SCALE CHANGES

Type Log	Depth	Scale Up Hole	Scale Down Hole

EQUIPMENT DATA

Run No.	ONE	
Panel No.	E-742	
Cart. No.	A-738	C-744
Sonde No.	E-748	
Mem. Panel No.	-	
G.R. Cart. No.	-	
G.R. Panel No.	-	
TTR No.	-	
Speed-F.P.M.	60	

REMARKS

Service Order No. - 2995

NOTE:
BOTH RESISTIVITY SCALES WERE SHIFTED ONE DECADE TO THE LEFT TO ENABLE CURVE TO STAY ON THE FILM WITHOUT BACK-UP SPOTS. SCALE IS CORRECTLY SHOWN BELOW.

SP TRACED ON LLD FROM NO CURRENT SP LOG W/ LL TOOL

CALIBRATION DATA

CALIBRATION BACKGND SOURCE GALV. INCR SENS. TAP SENS. TAP TIME

CALIBRATION:	BACKGND. CPS.	SOURCE CPS.	GALV. INCR. DIVISION	SENS. TAP (FOR CAL.)	SENS. TAP (RECORD)	TIME CONST.
GAMMA RAY:						

All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to Clause 7 of our General Terms and Conditions as set out in our current Price Schedule.

SPONTANEOUS-POTENTIAL
MILLIVOLTS

− 20 MV +

DEPTHS

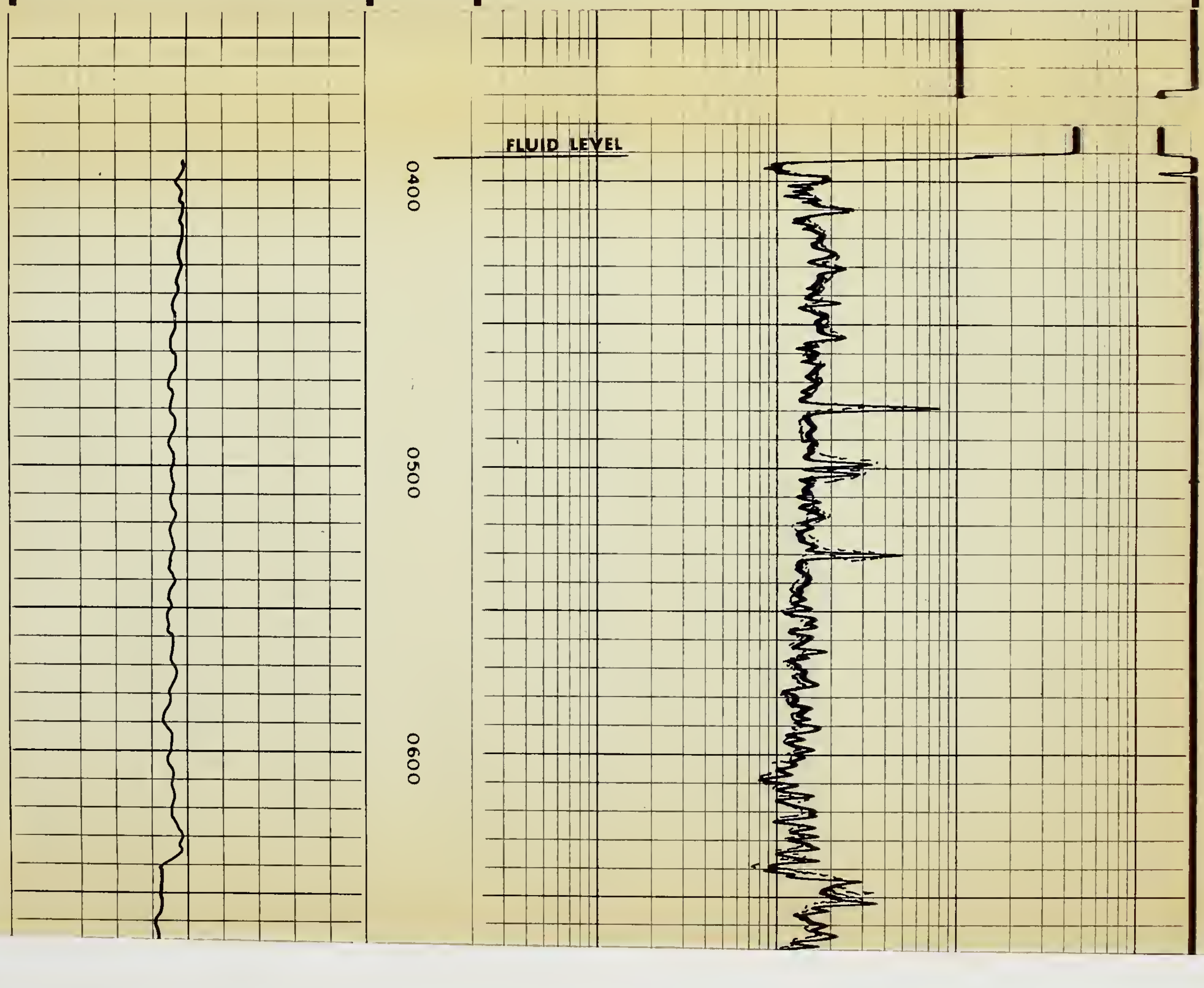
RESISTIVITY
OHMS. M^2 M

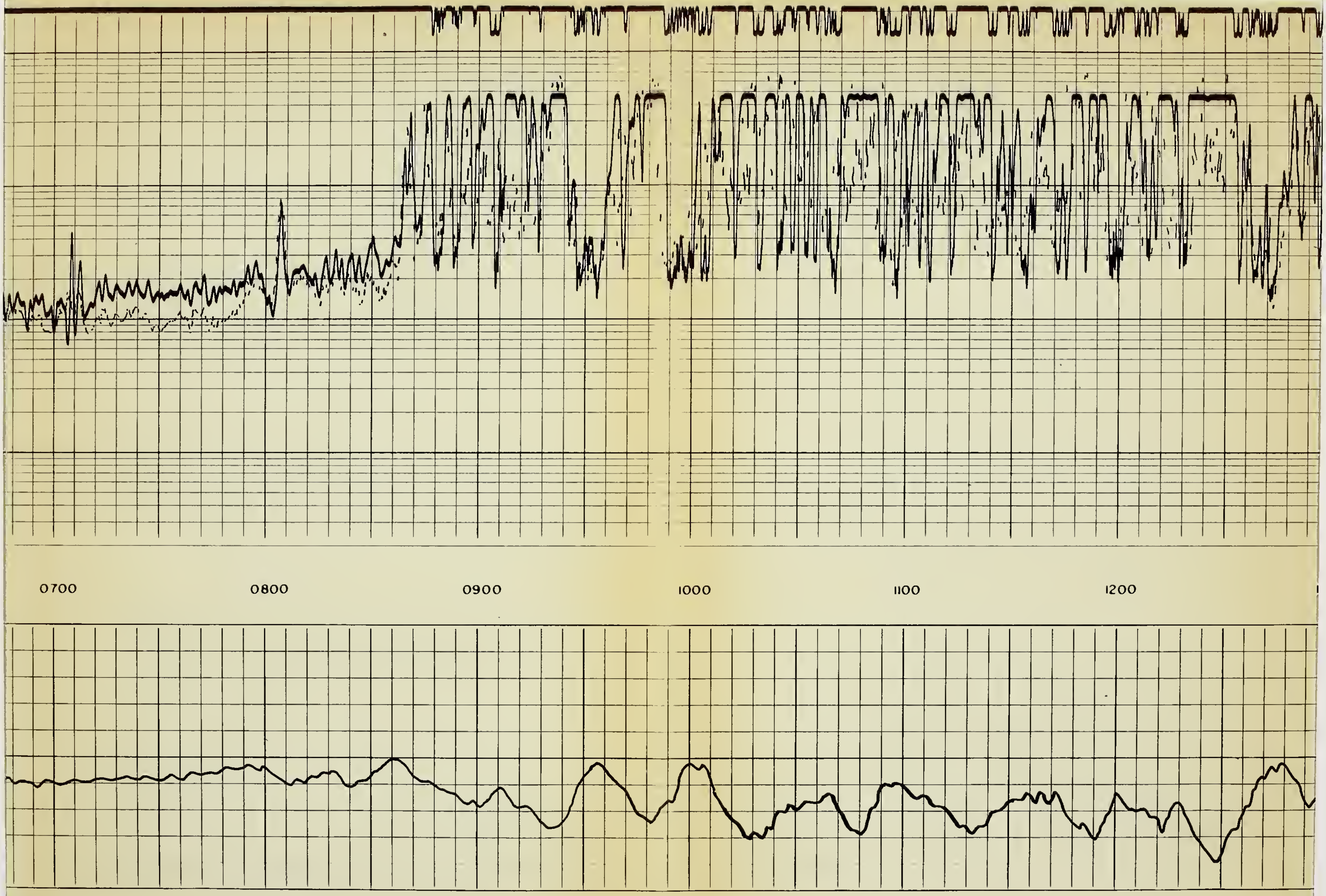
DEEP LATEROLOG

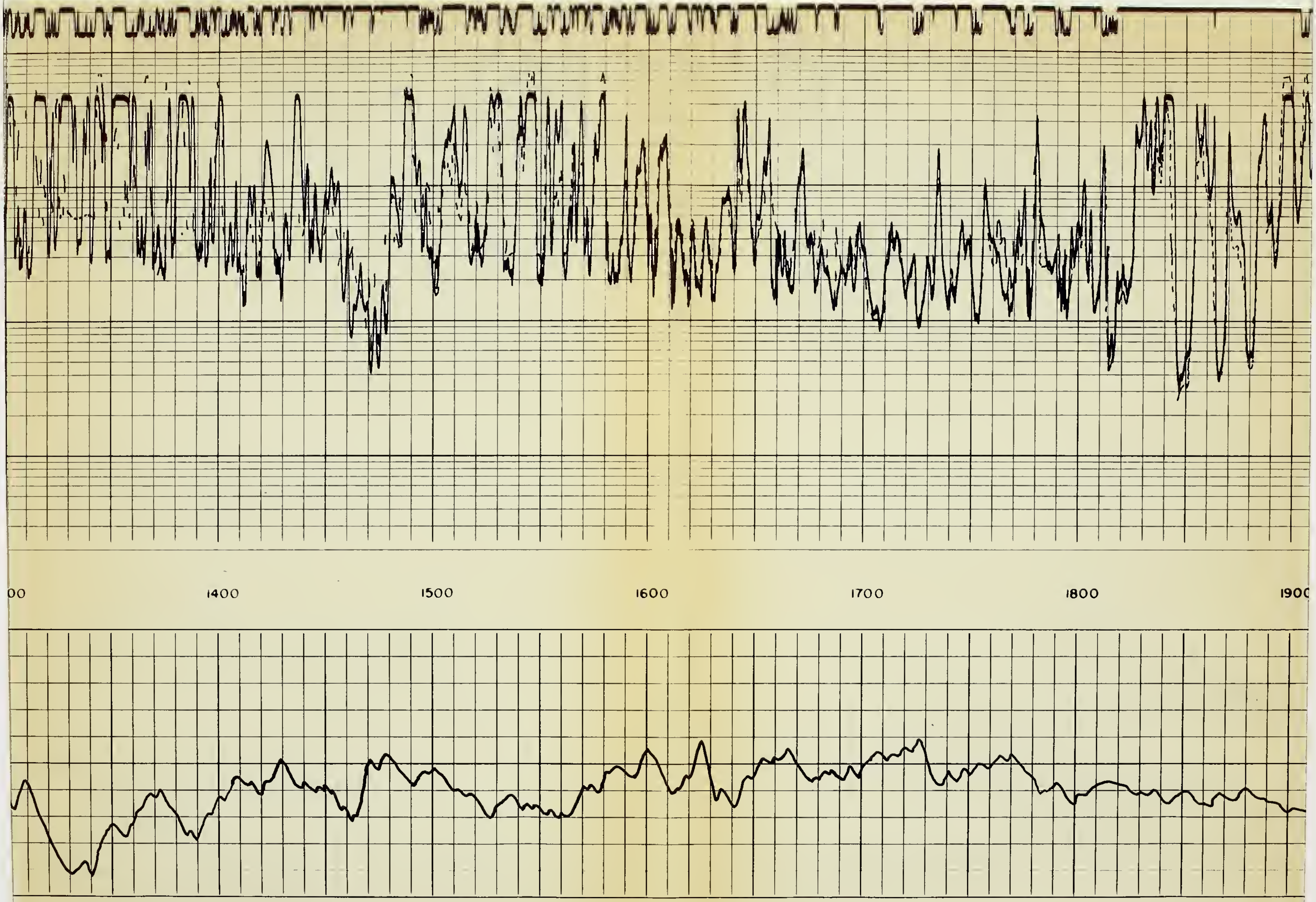
2.0 10 100 1000 10000 20000

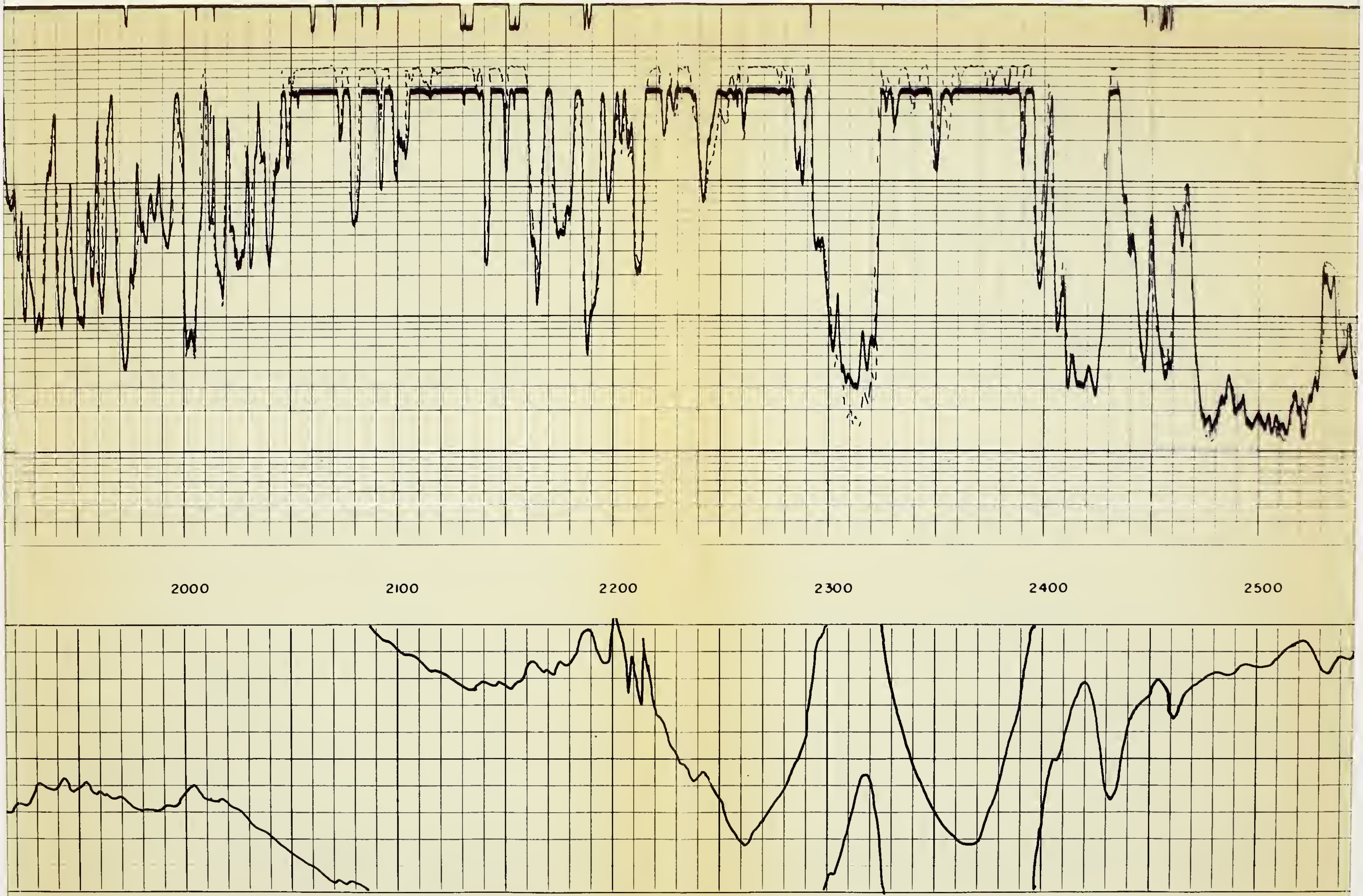
SHALLOW LATEROLOG

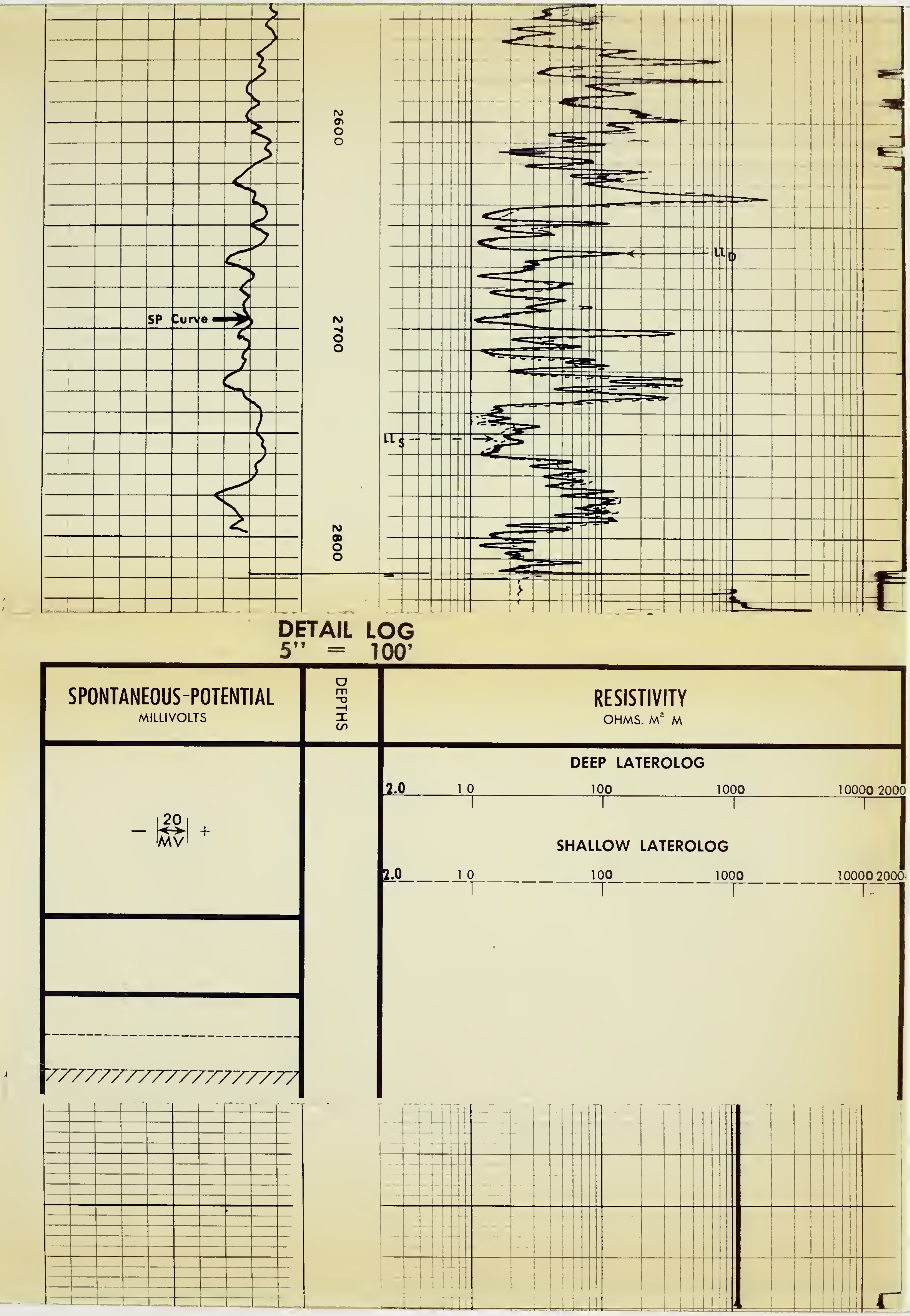
2.0 10 100 1000 10000 20000

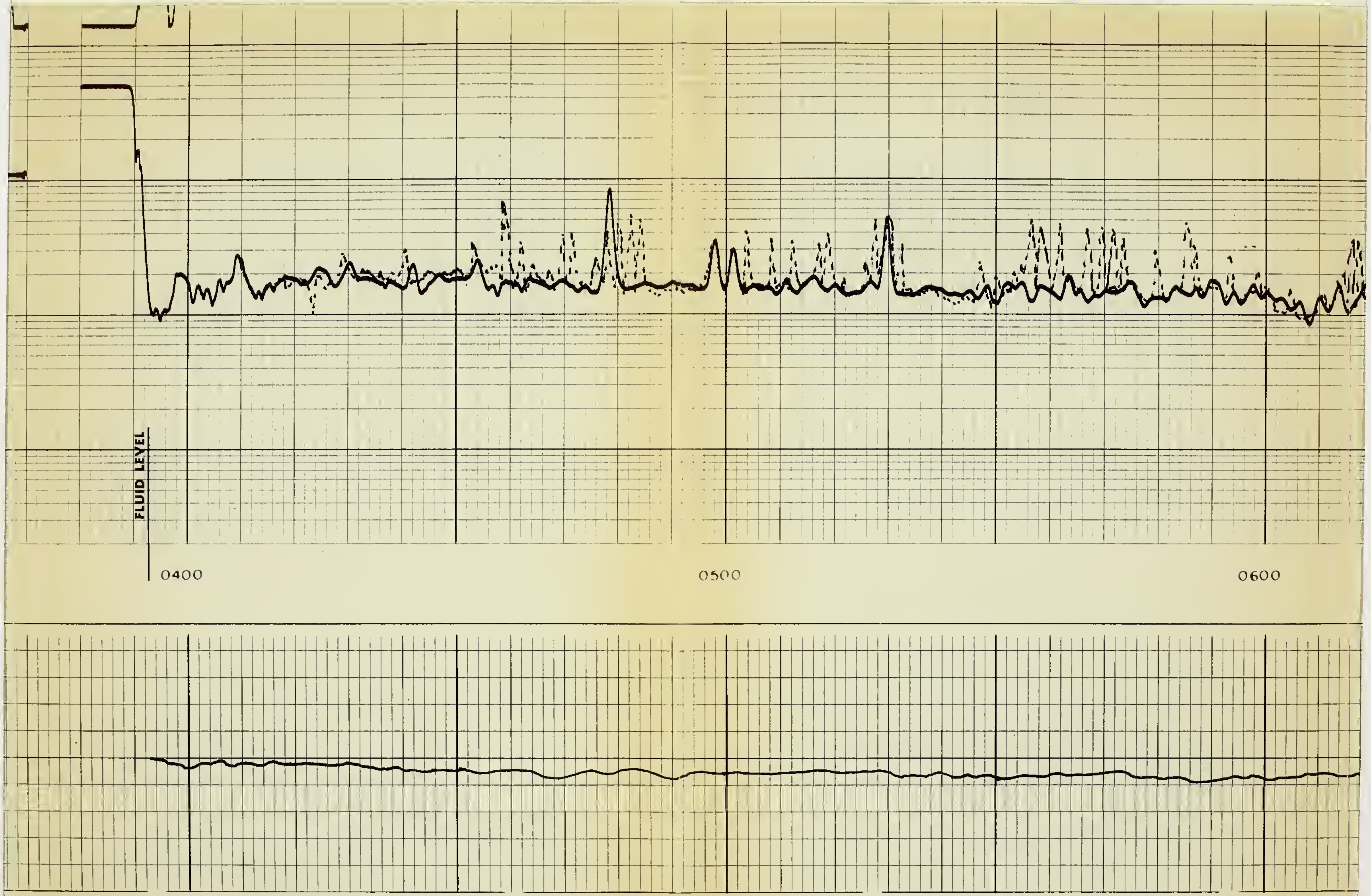


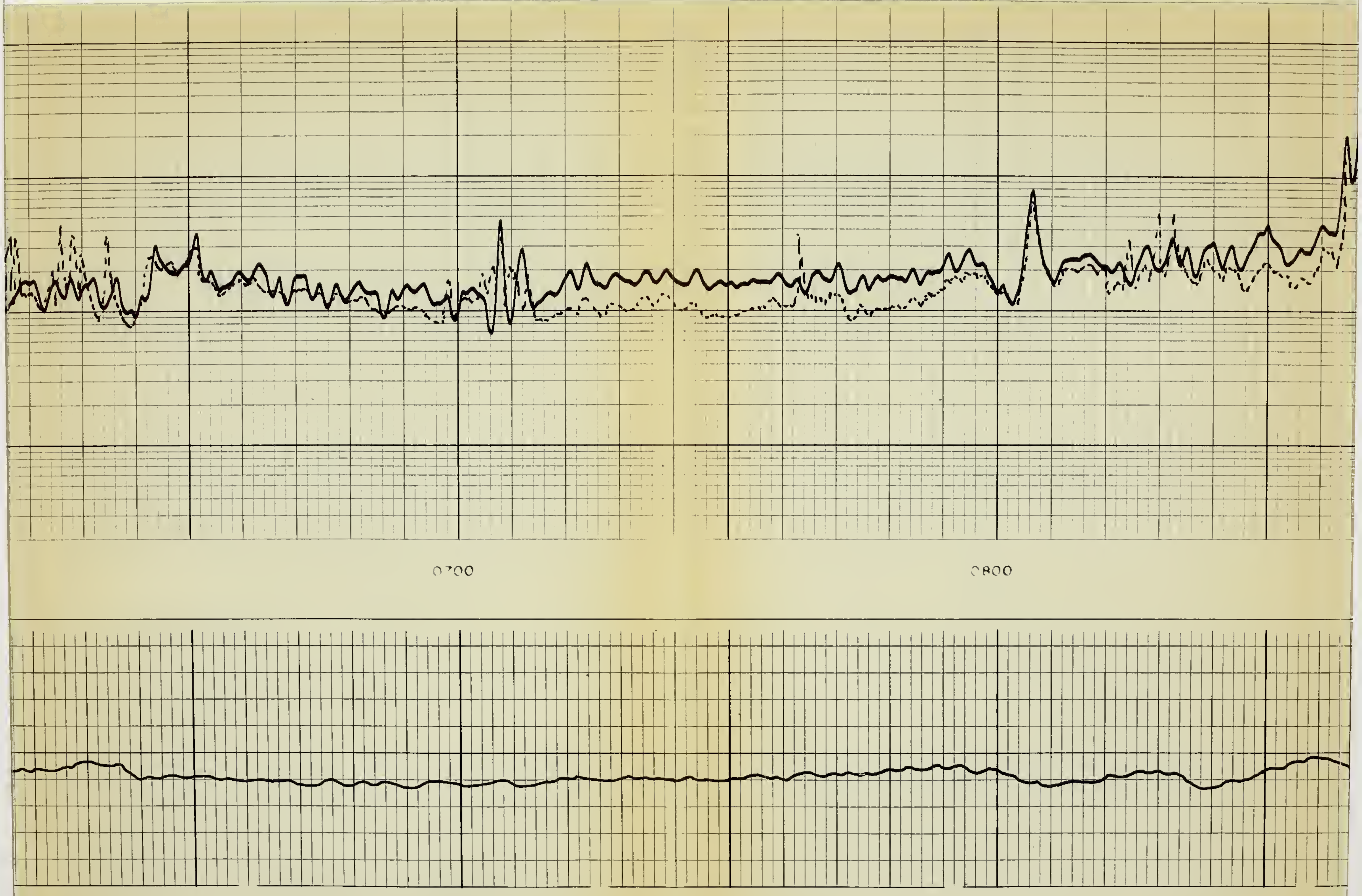

0700
0800
0900
1000
1100
1200


00
1400
1500
1600
1700
1800
1900


2000
2100
2200
2300
2400
2500


2600
2700
2800
SP Curve
LLD
LLS
DETAIL LOG
5'' = 100'
SPONTANEOUS-POTENTIAL
MILLIVOLTS
— 20 MV +
DEPTHS
RESISTIVITY
OHMS. M² M
DEEP LATEROLOG
2.0
1 0
100
1000
10000 2000
SHALLOW LATEROLOG
2.0
1 0
100
1000
10000 2000


FLUID LEVEL
0400
0500
0600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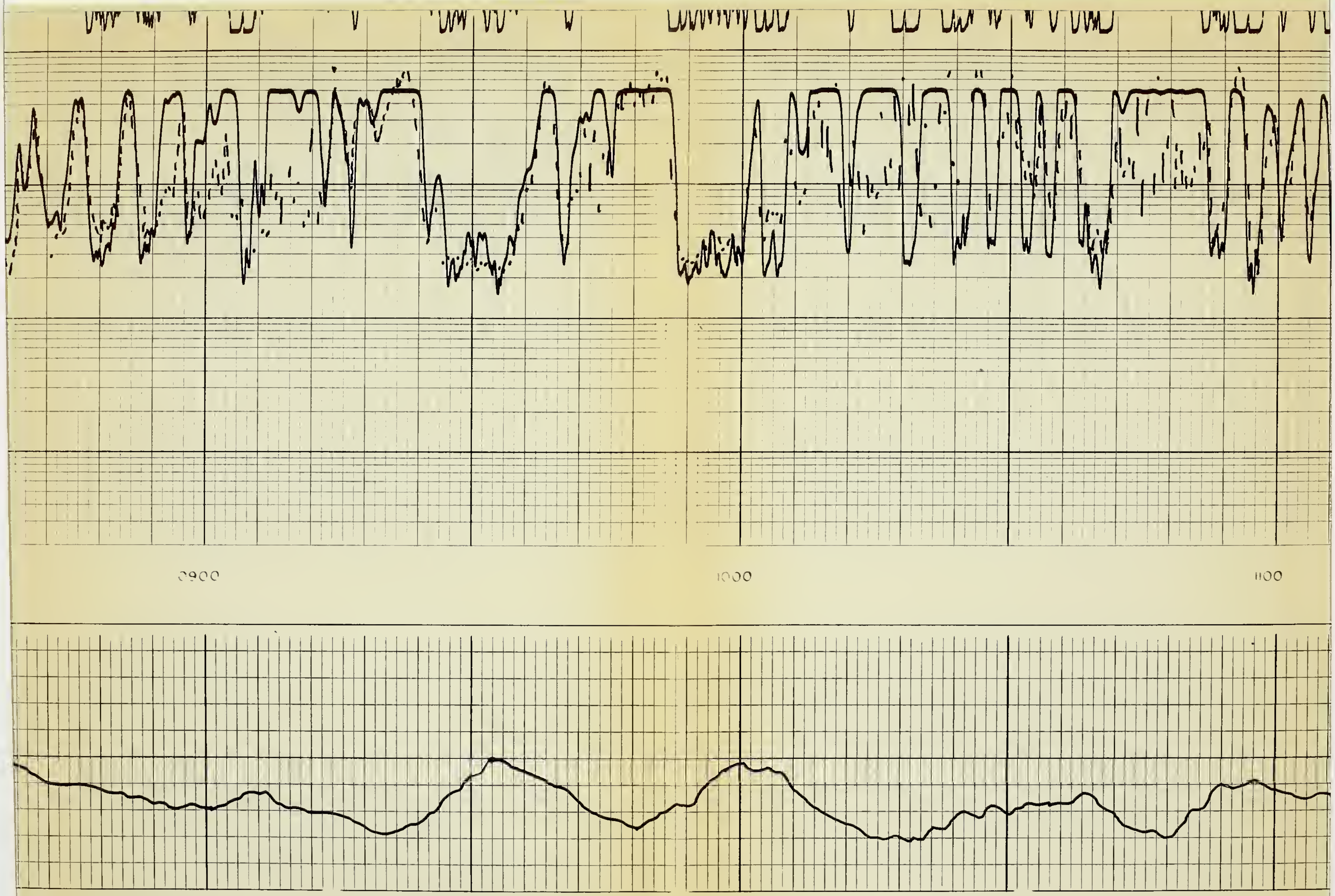
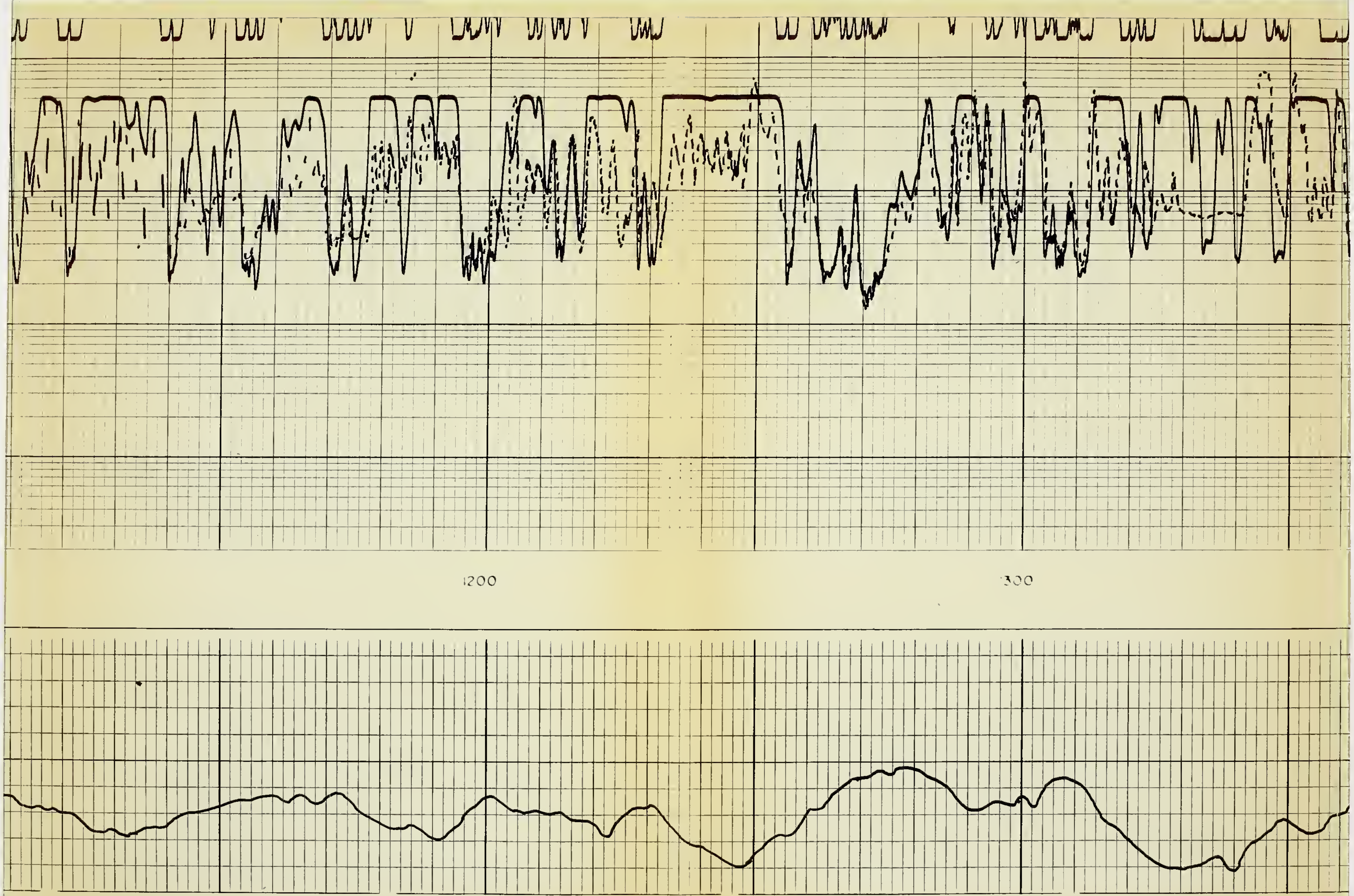
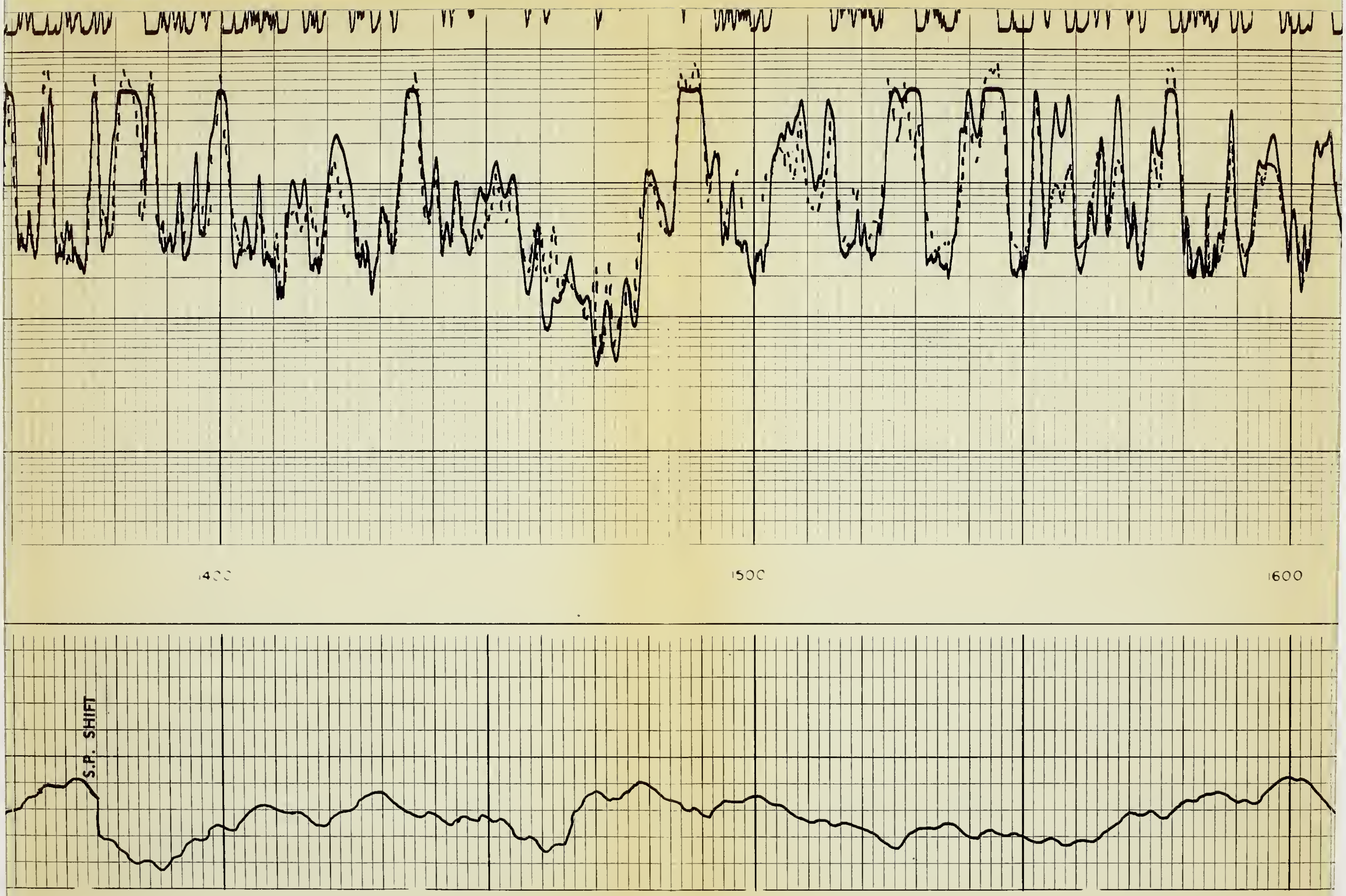
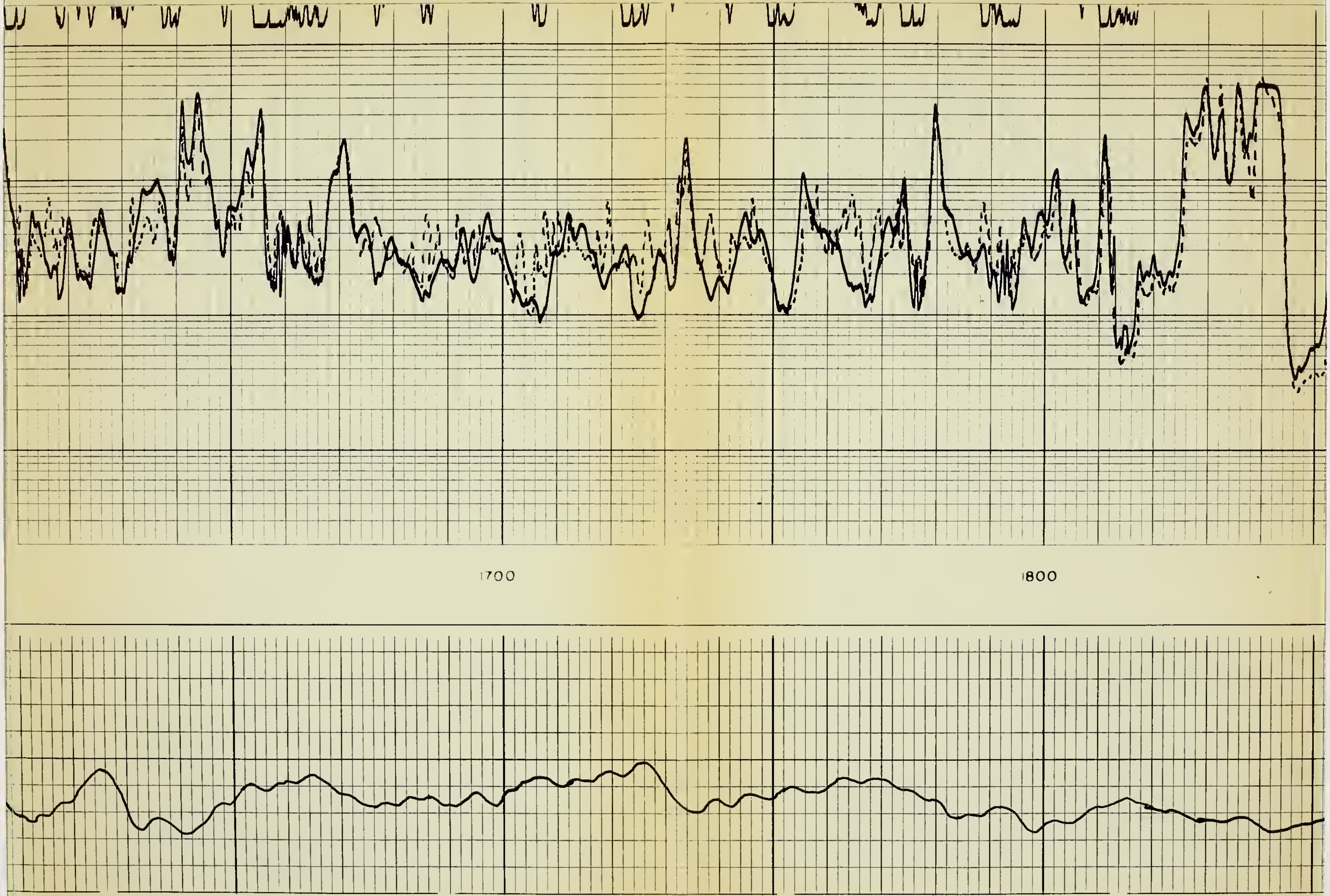
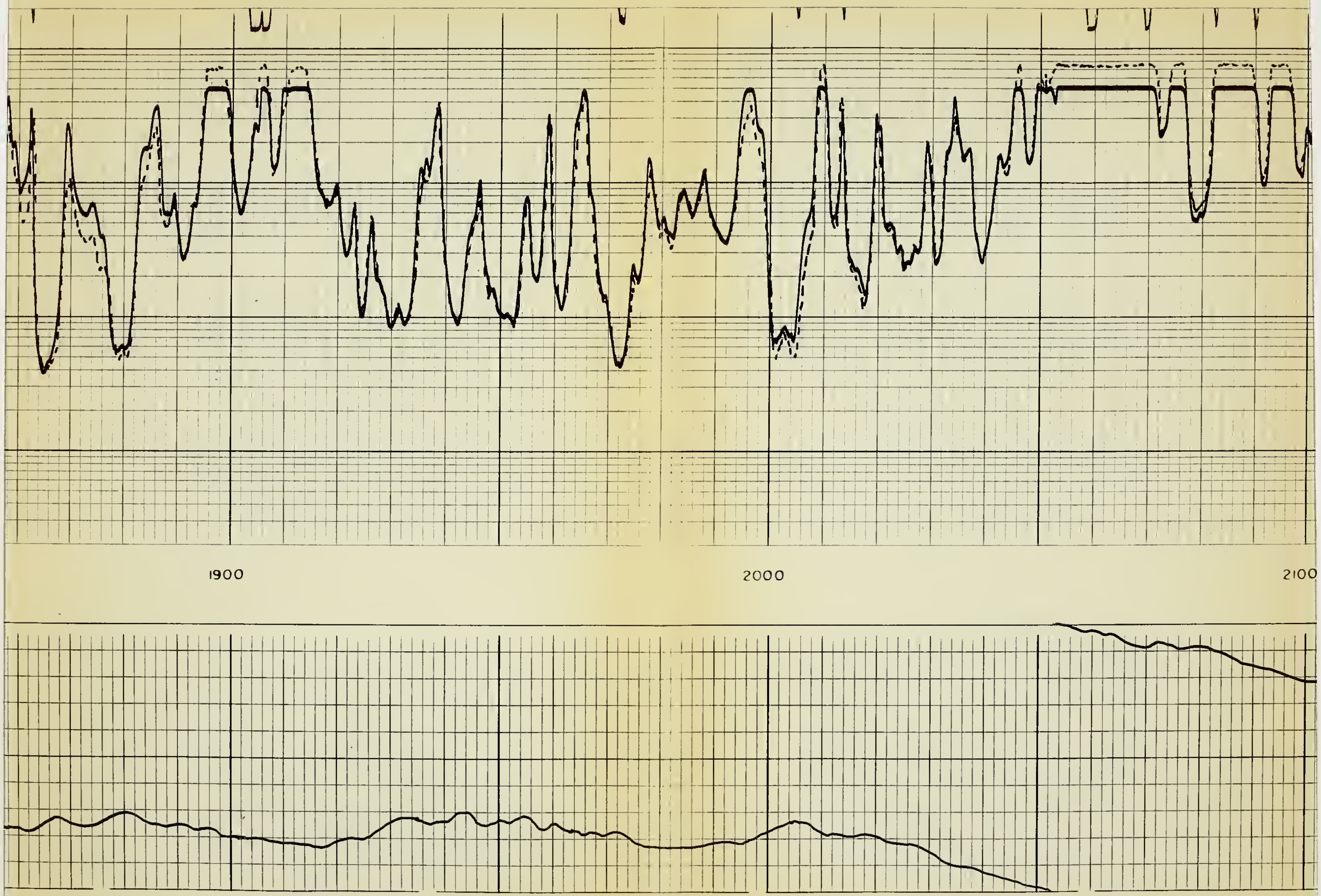
0800

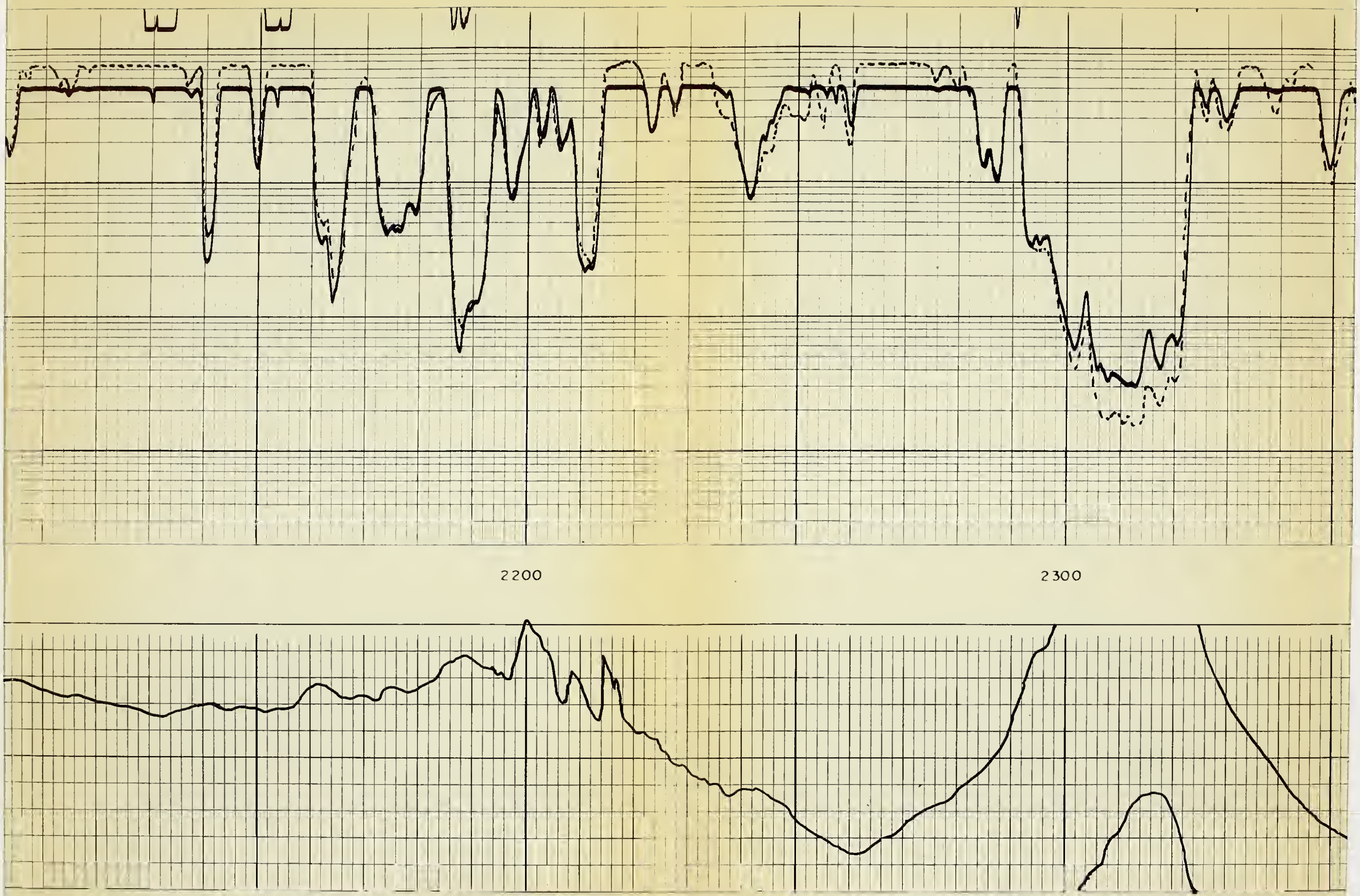

0900
1000
1100

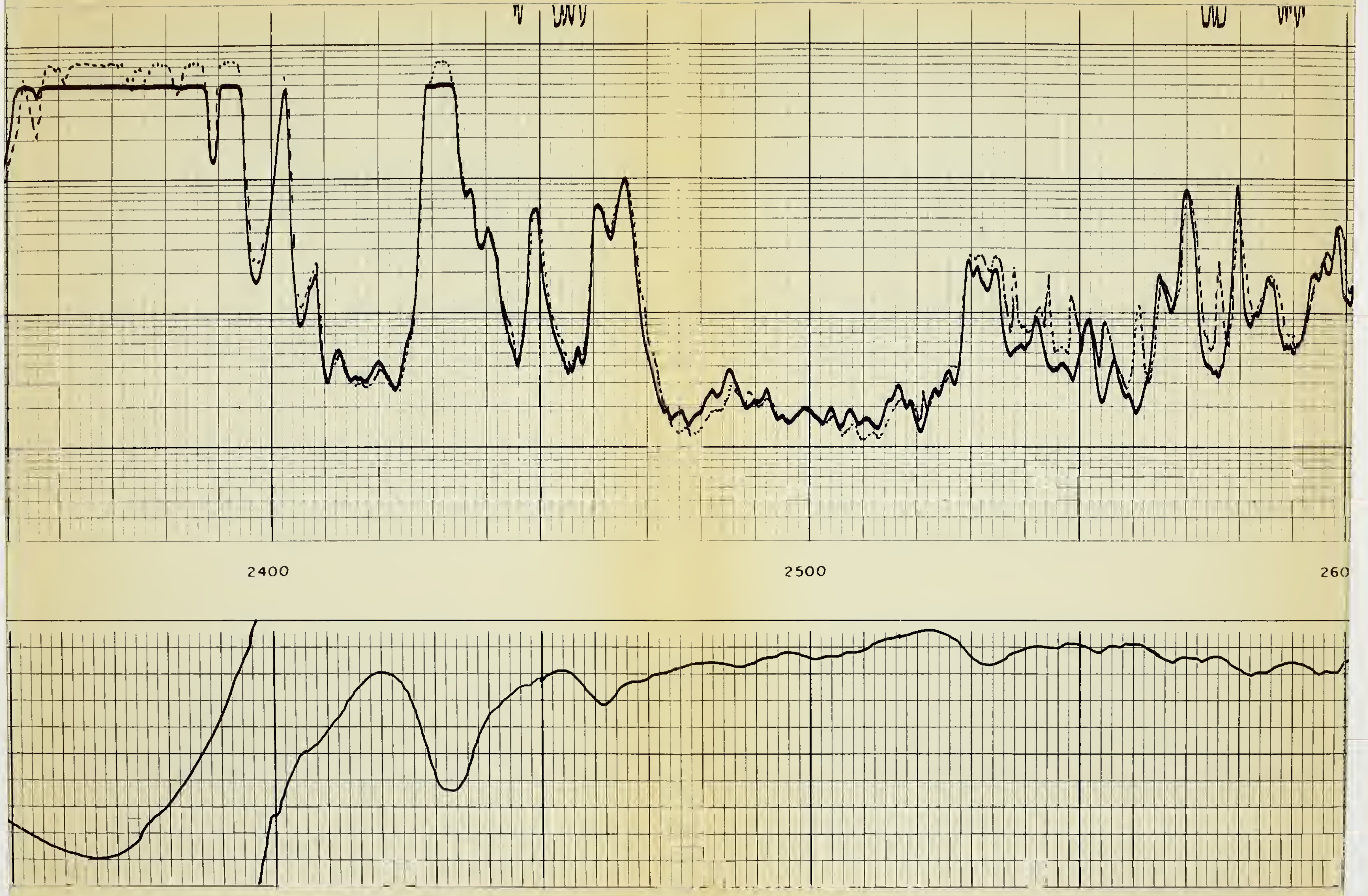

1200
1300

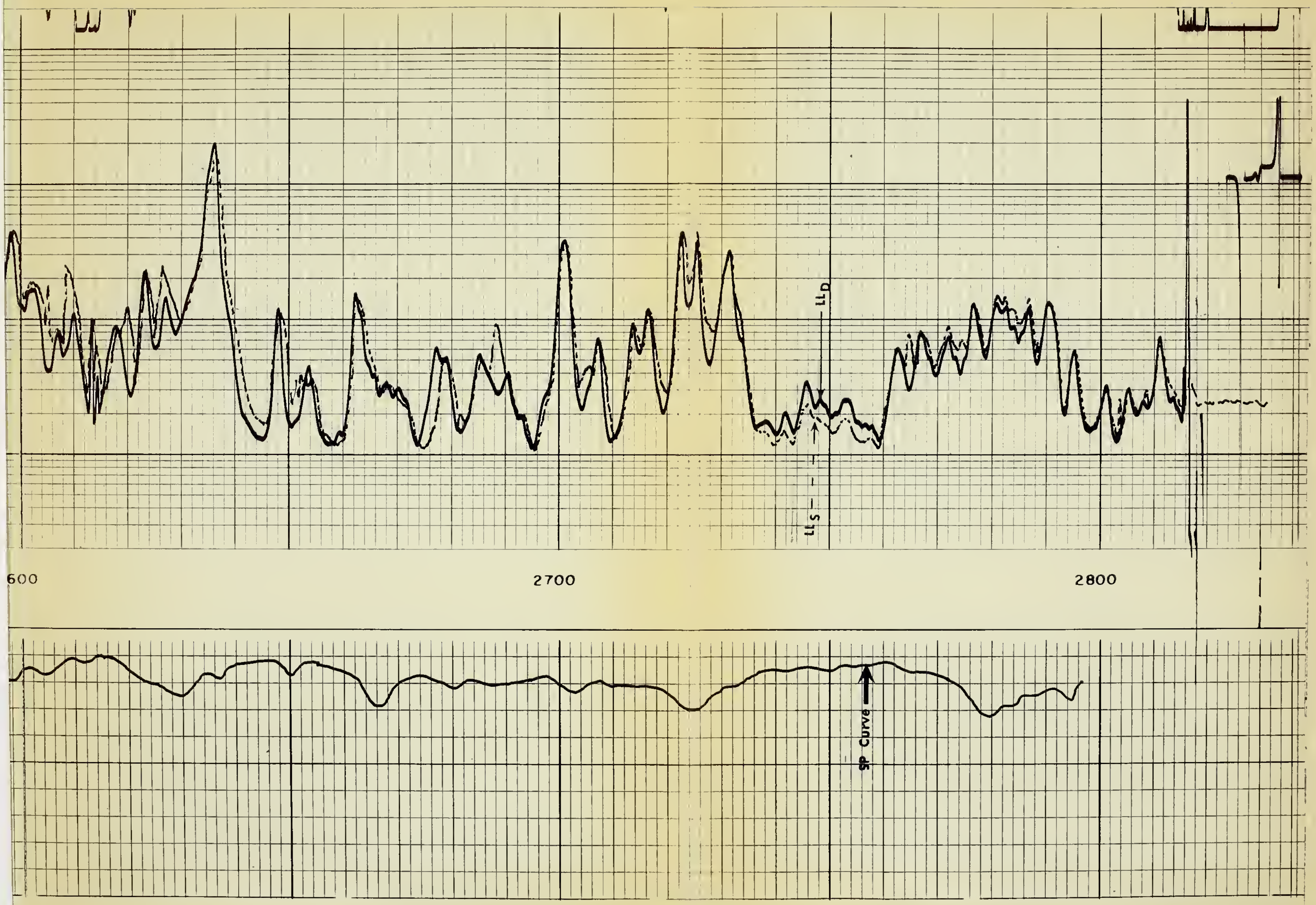

1400
1500
1600
S.P. SHIFT

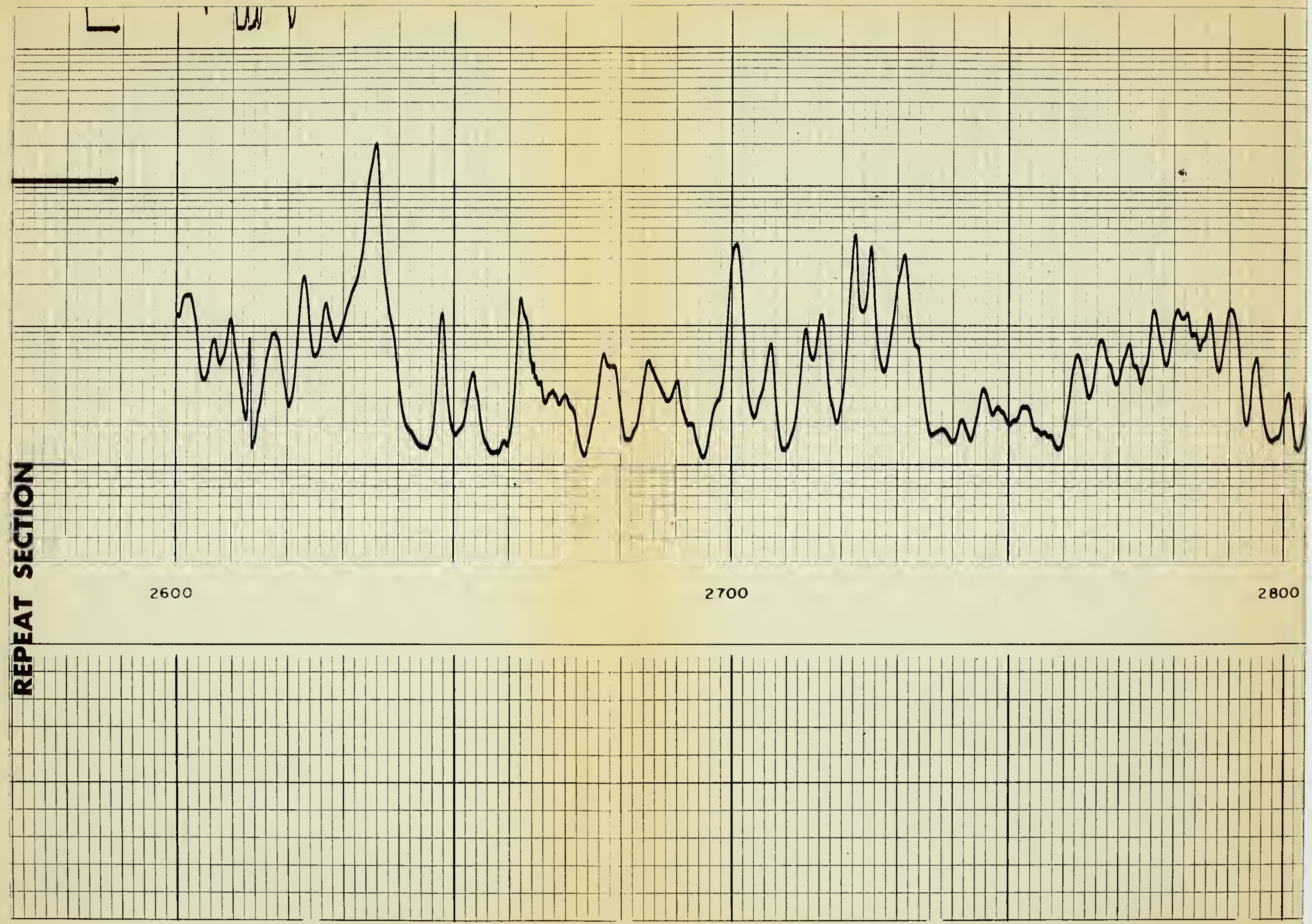

1700
1800

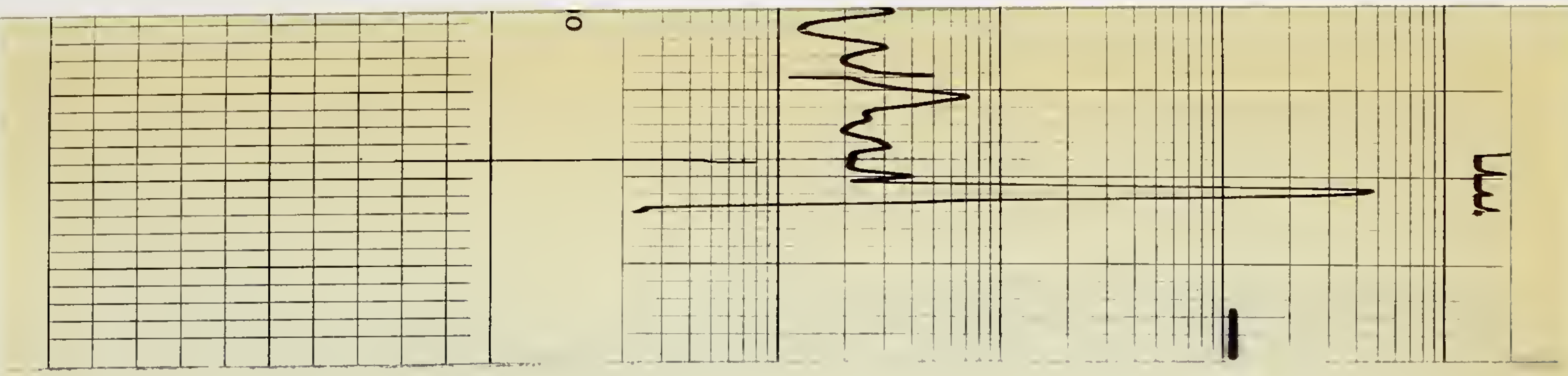

1900
2000
2100


2200
2300


2400
2500
260


LLD
LLS
600
2700
2800
SP Curve


REPEAT SECTION
2600
2700
2800



SHALLOW LATEROLOG

2.0 1 0 100 1000 10000 20000

DEEP LATEROLOG

2.0 1 0 100 1000 10000 20000

− |20 ↔ MV| +

SPONTANEOUS-POTENTIAL
MILLIVOLTS

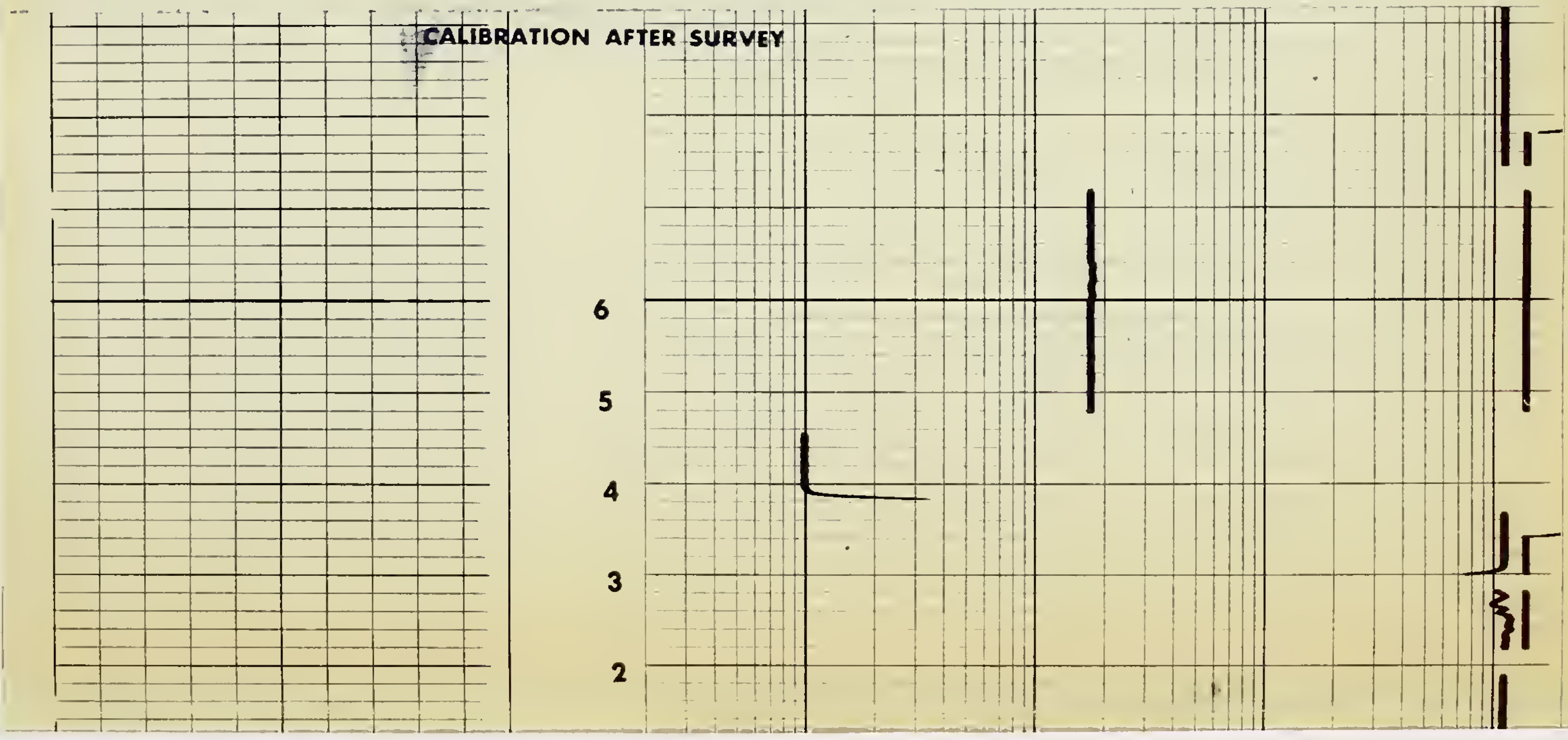
DEPTHS

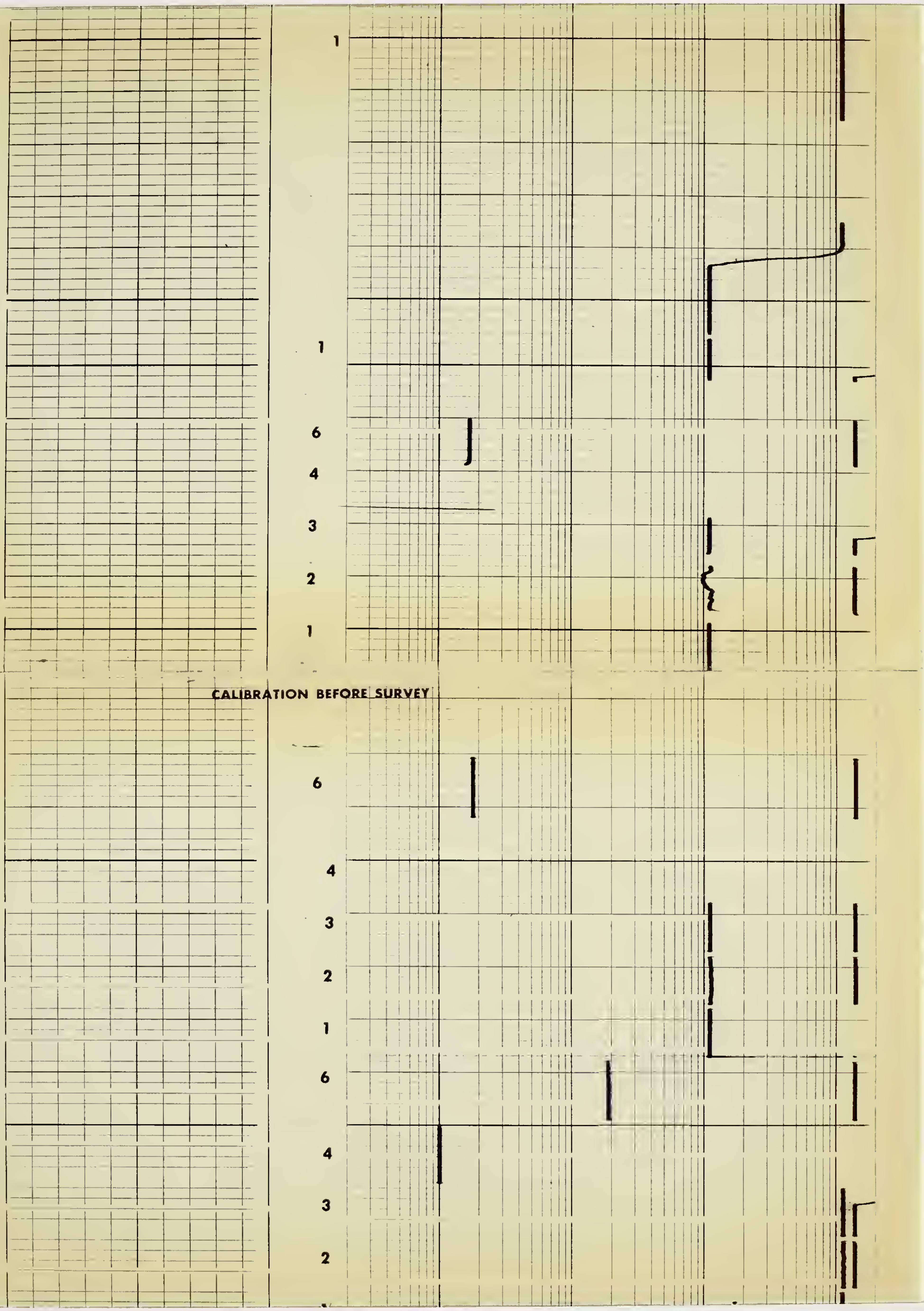
RESISTIVITY
OHMS. M² M

COMPANY ATLANTIC RICHFIELD COMPANY
WELL SORGHUM GULCH #11
FIELD SORGHUM GULCH
COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 2818
SCHL. TD 2830
DRLR TD 2826
Elev:
KB
DF
GL 6900

CALIBRATION RECORD




1
1
6
4
3
2
1
CALIBRATION BEFORE SURVEY
6
4
3
2
1
6
4
3
2

SIMULTANEOUS DUAL LATEROLOG CALIBRATION CODING

1. MECHANICAL ZERO
2. RECORD SET (SP CALIBRATE)
3. TEST - 1 (1 ohm-m)
4. TEST - 2 (1000 ohm-m)
5. TOOL CAL (31.6 ohm-m)

GAMMA RAY CALIBRATION CODING

1. MECHANICAL ZERO
2. TEST - 1 - ELECTRICAL ZERO
3. TOOL CAL - BACKGROUND
4. TOOL CAL- TEST JIG ON
5. CAL CHECK f = ______

SEQUENTIAL DUAL LATEROLOG CALIBRATION CODING

1. MECHANICAL ZERO
2. CABLE BALANCE ADJUST - LLd ONLY
3. FUNCTION FORMER 1000 ohm-m
4. FUNCTION FORMER 1 ohm-m
5. MEMORIZER ADJUST - LLd ONLY (DOES NOT APPLY IF GR IS NOT RUN)
6. CALIBRATE LLd - 17 ohm-m
   LLd - 29 ohm-m

CALIBRATION RECORD

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #11

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 2818
SCHL. TD 2830
DRLR TD 2826
Elev:
KB ______
DF ______
GL 6900

SWS-1975-A

Schlumberger

TEMPERATURE LOG

COUNTY RIO BLANCO
FIELD or LOCATION SORGHUM GULCH
WELL SORGHUM GULCH #11
COMPANY ATLANTIC RICHFIELD

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #11

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

LOCATION
12' NSL & 160' WEL
Sec. 7 Twp. 3S Rge. 96W

Other Services:
L-9
BHC

Permanent Datum: ; Elev.:
Log Measured From , Ft. Above Perm. Datum
Drilling Measured From

Elev.: K.B.
D.F.
G.L.

Date	9-3-74		
Run No.	ONE		
Depth—Driller	2826		
Depth—Logger	2823		
Btm. Log Interval	2822		
Top Log Interval	393		
Casing—Driller	8 5/8 @ 62	@	@
Casing—Logger	-		
Casing Size 1	To	To	To
2	To	To	To
Casing Weight 1			
2			
Casing Thickness 1			
2			
Bit Size 1	6 1/4 To 1282	To	To
2	4 7/8 To 2826	To	To
Type Fluid in Hole	WATER @ 393		
Dens. Visc.	- -		
Time Since Circ.	2 DAYS		
BHT	127		
Equip. Location	5639 VERNAL		
Recorded By	ED MIXA		
Witnessed By	SAM BERKHEISER		

The well name, location and borehole reference data were furnished by the customer.

FOLD HERE

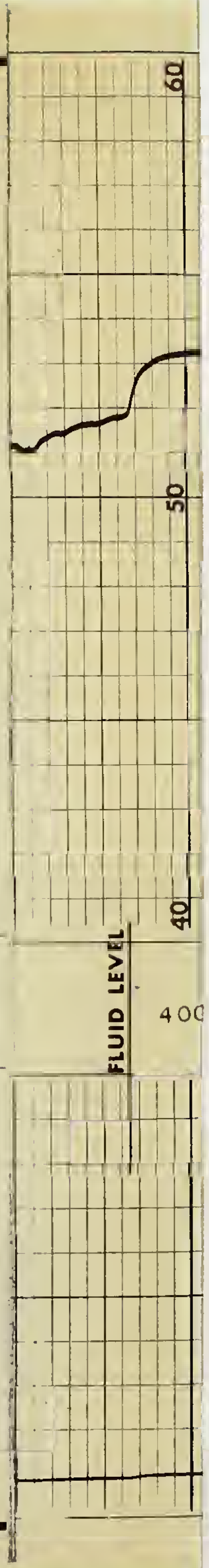
REMARKS:

CEMENTATION DATA

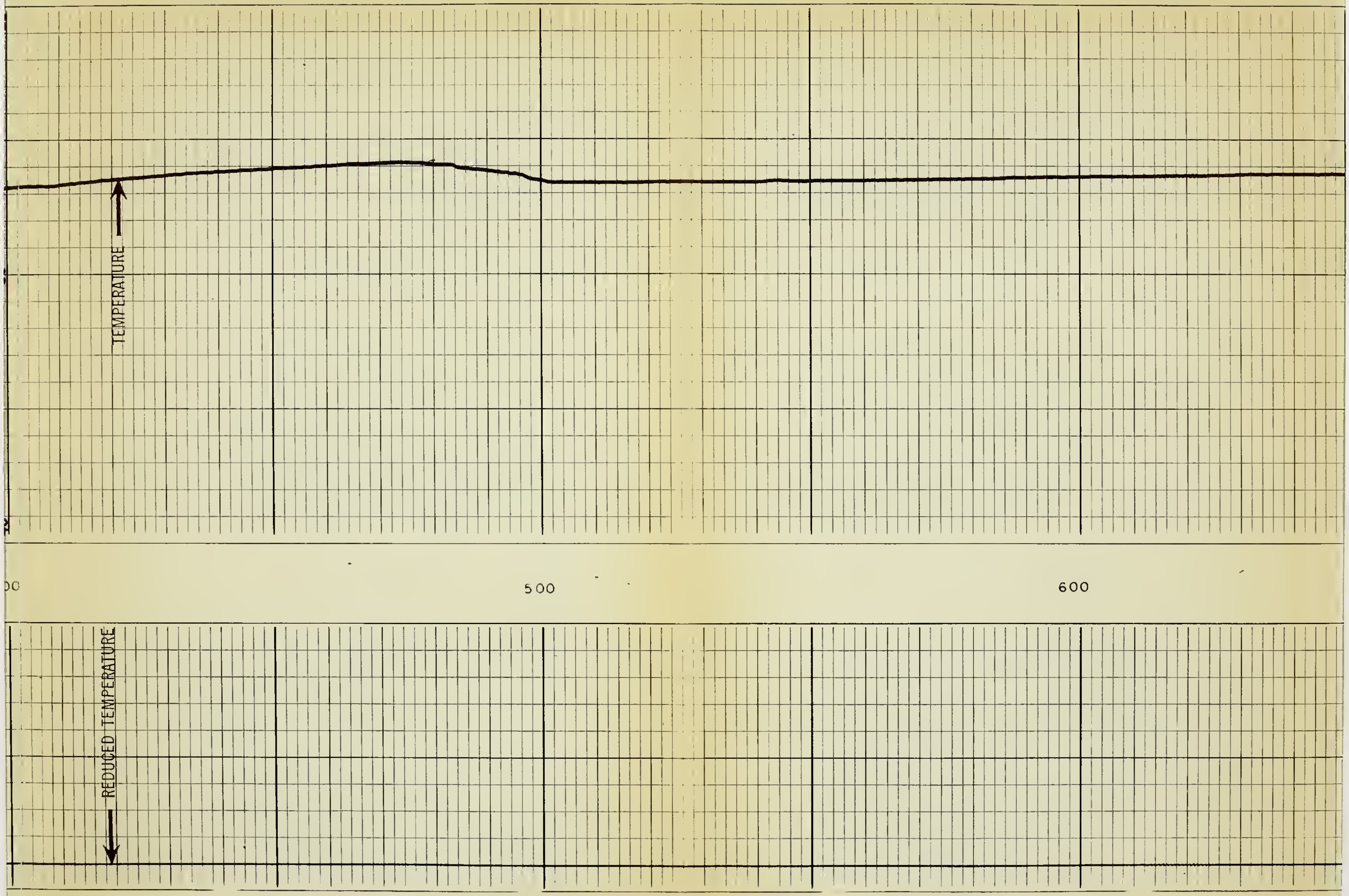
Date	Depth	Type of Cement	No of Sacks	Additives	Calculated Top

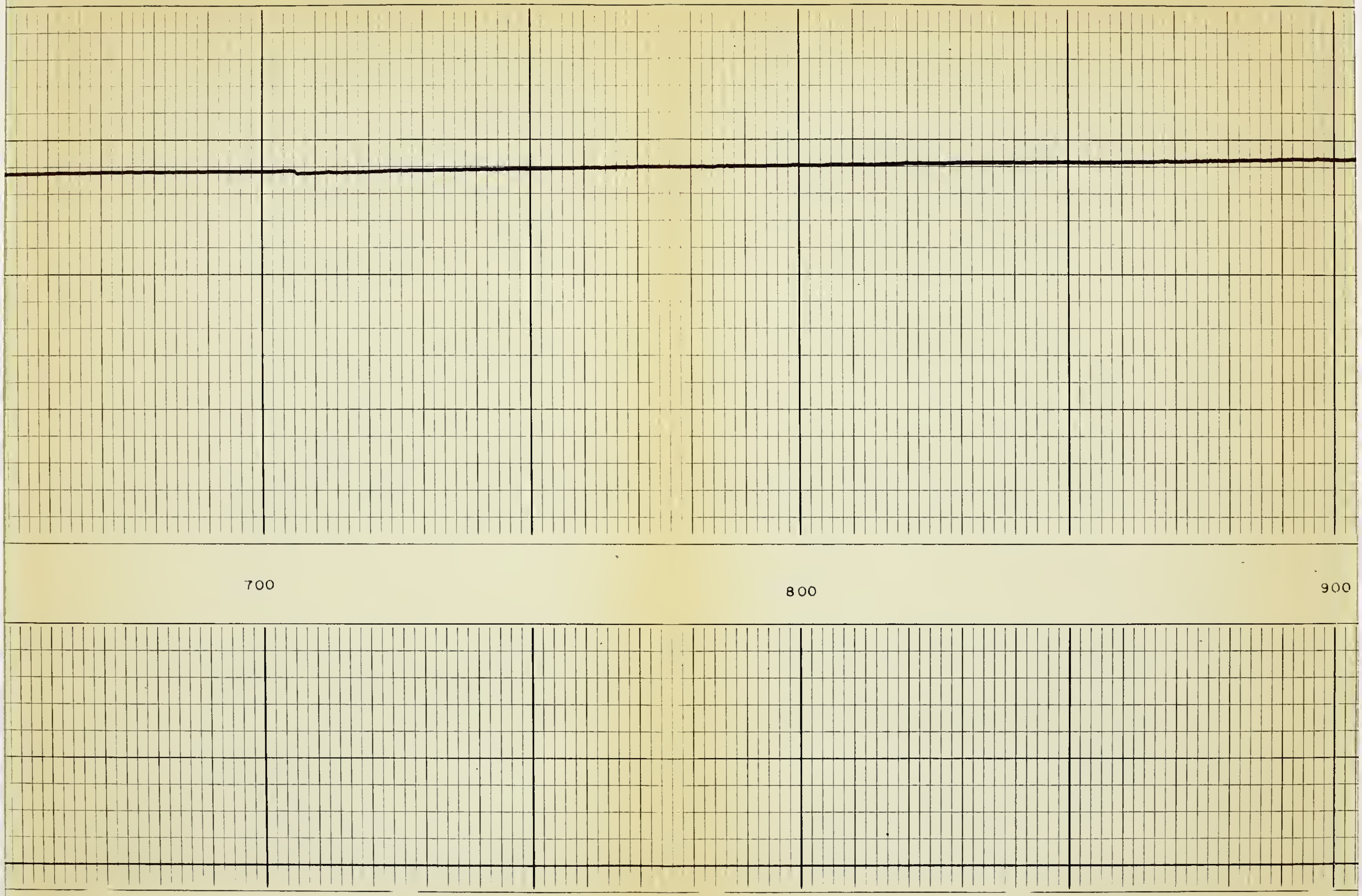
TEMPERATURE °F.

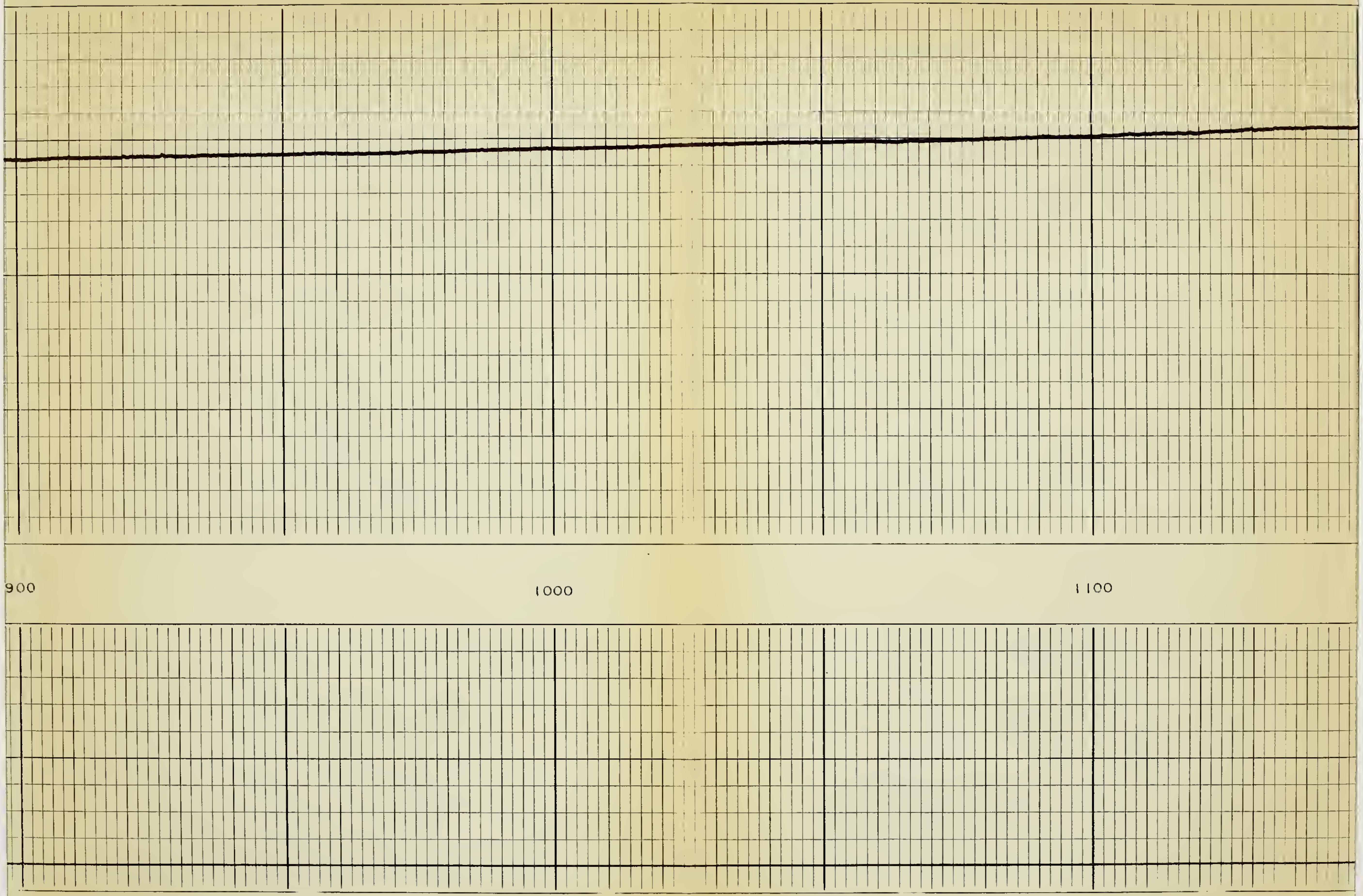
REDUCED SENSITIVITY TEMPERATURE

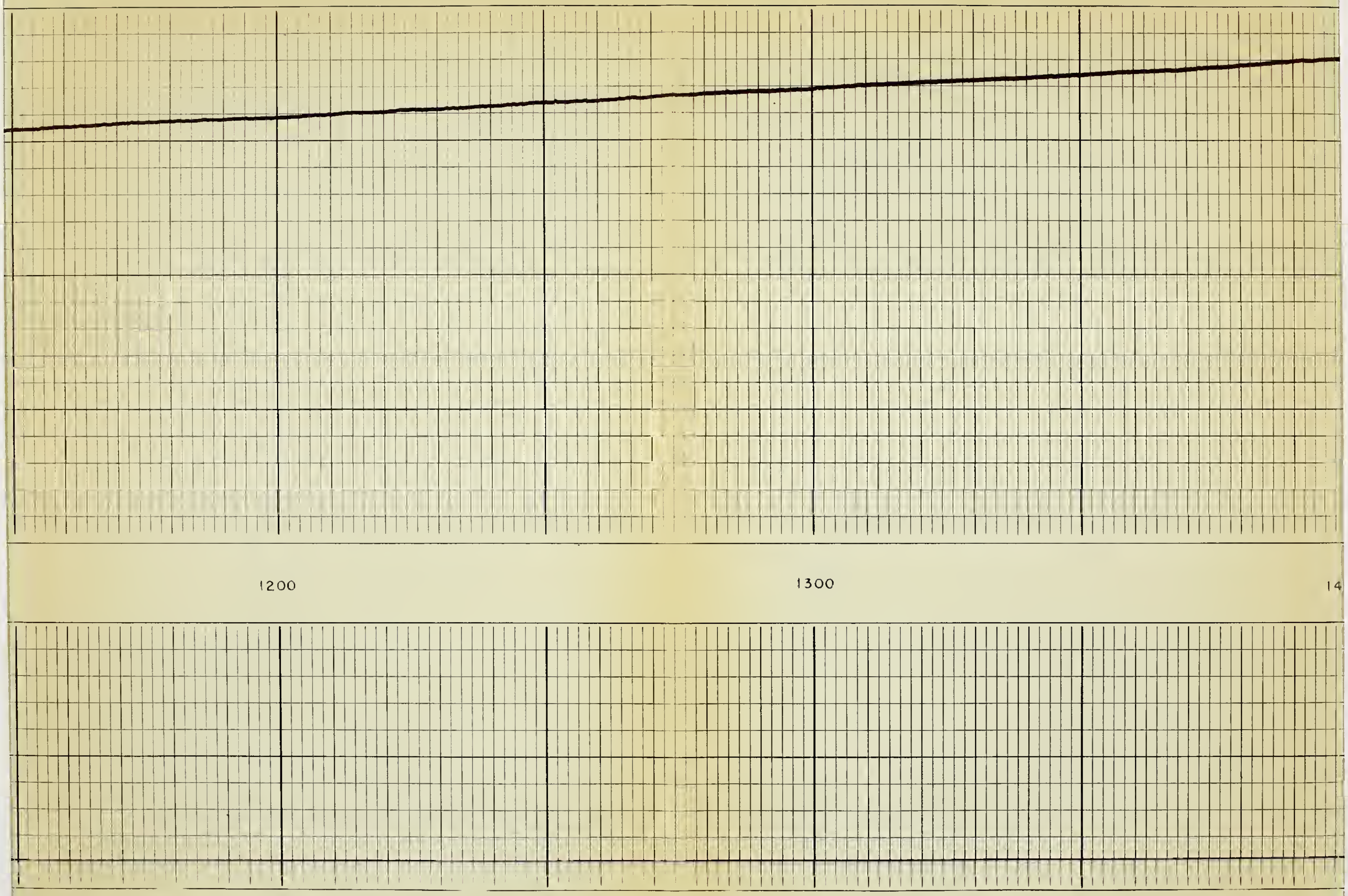


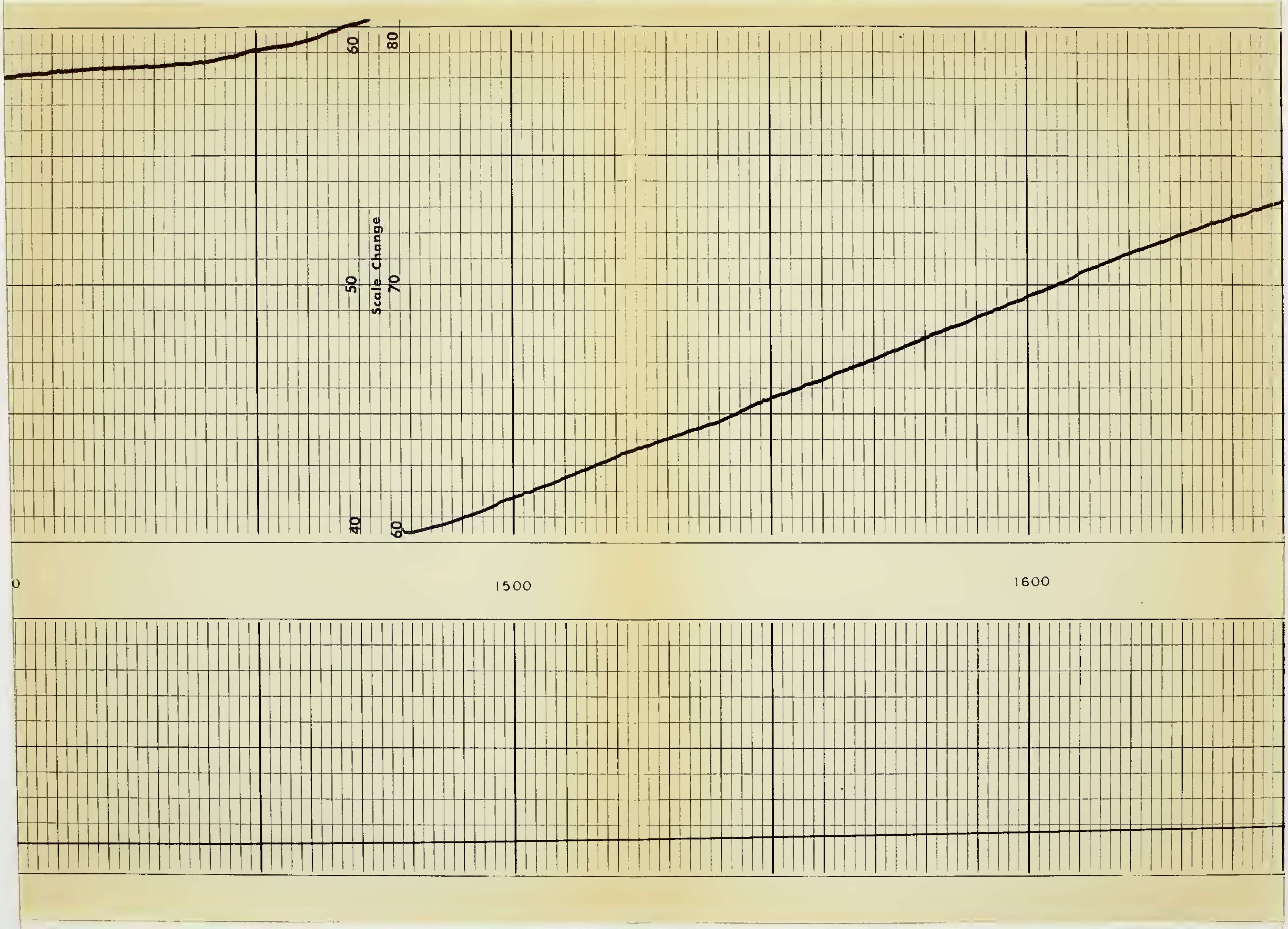
SWS-368-C

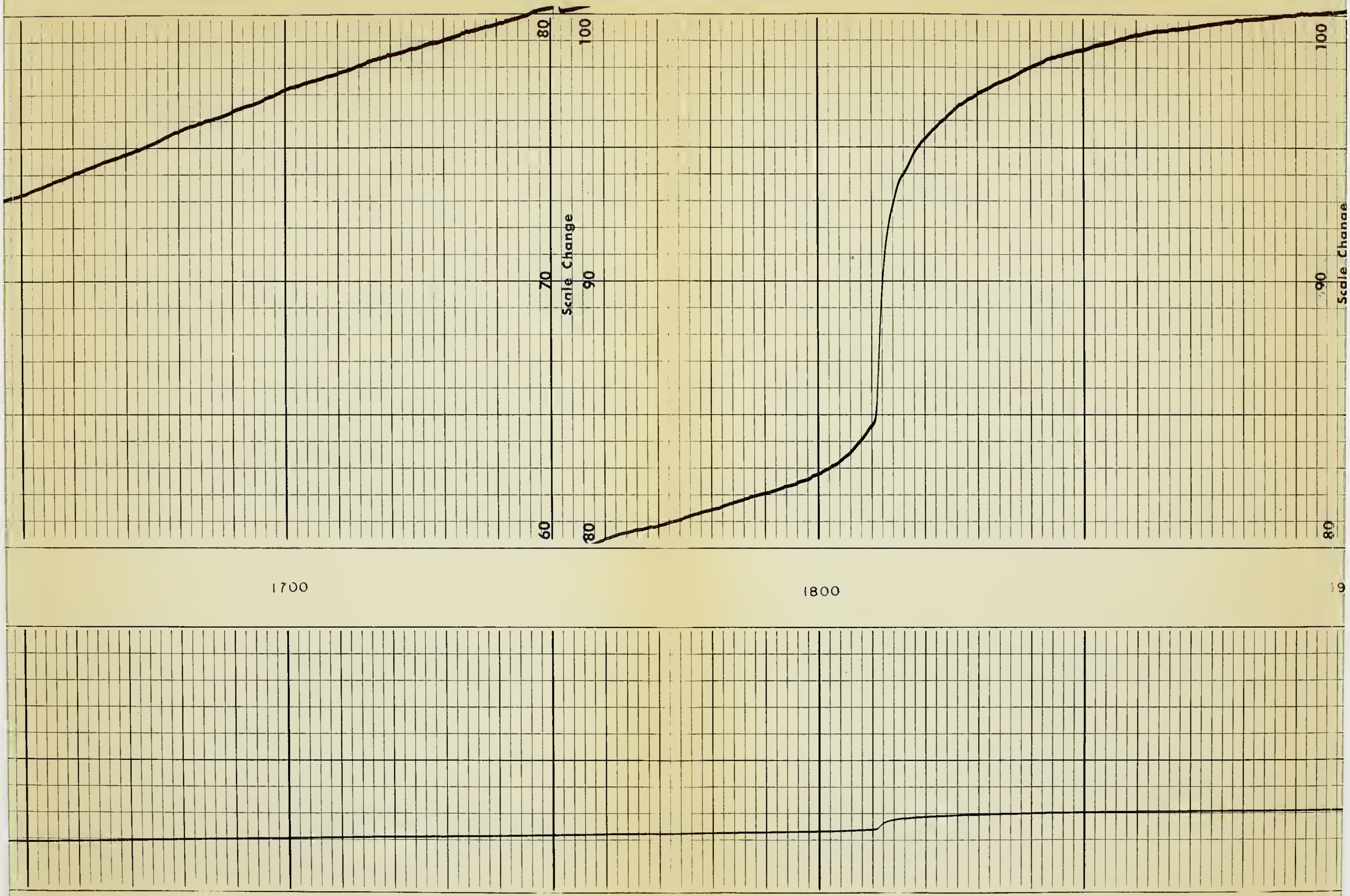

TEMPERATURE
00
500
600
REDUCED TEMPERATURE

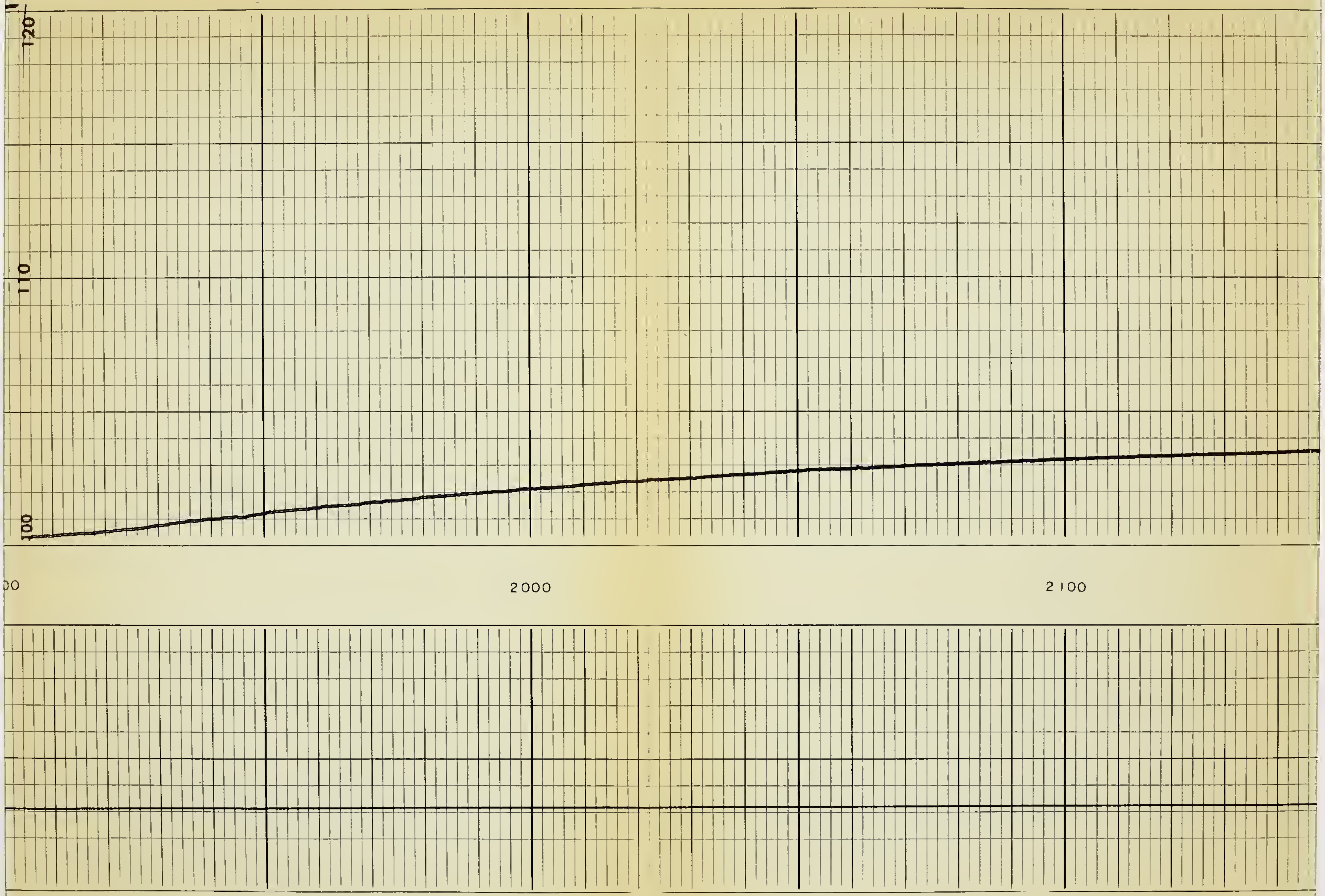

700
800
900

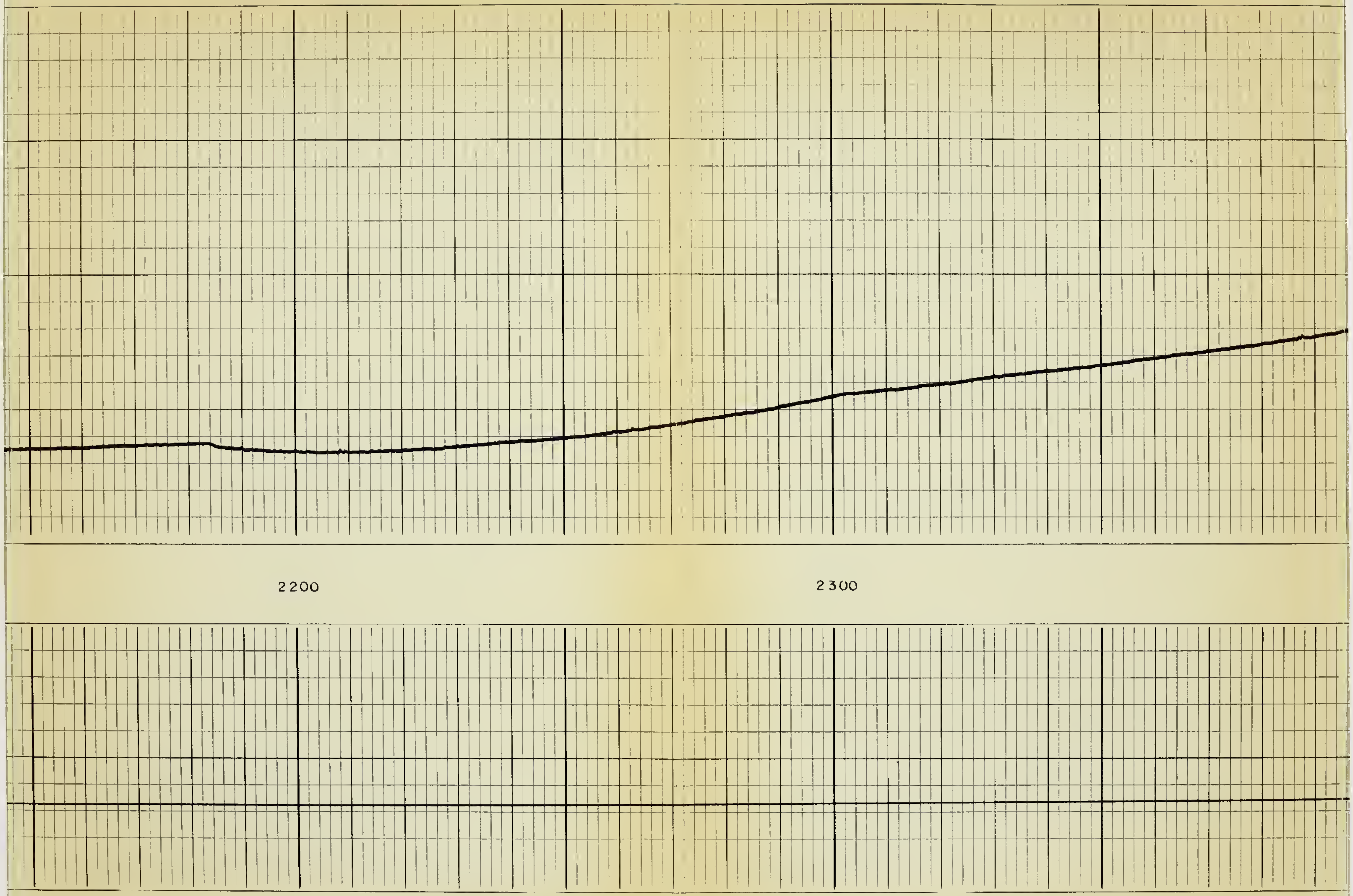

900
1000
1100

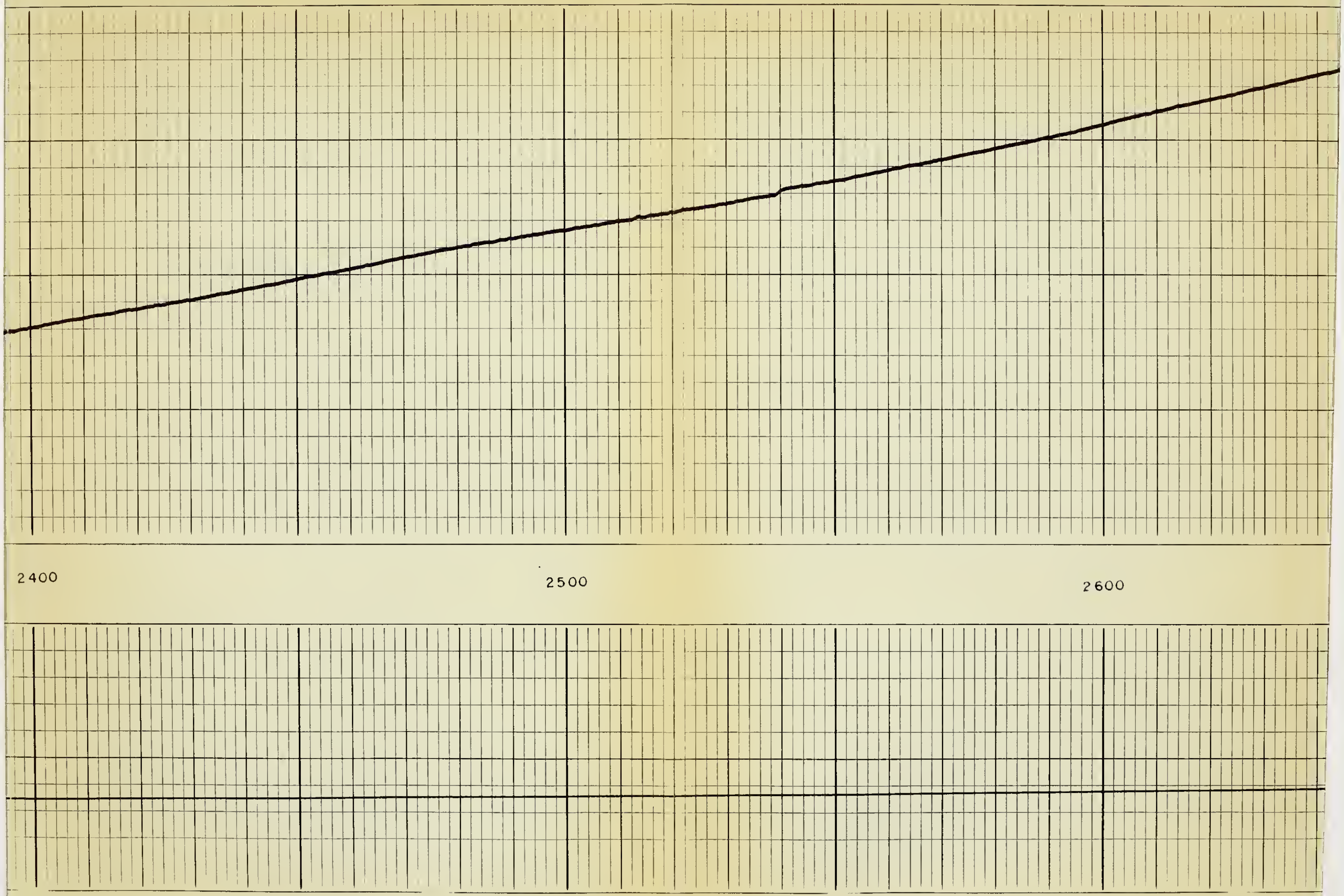

1200
1300
14

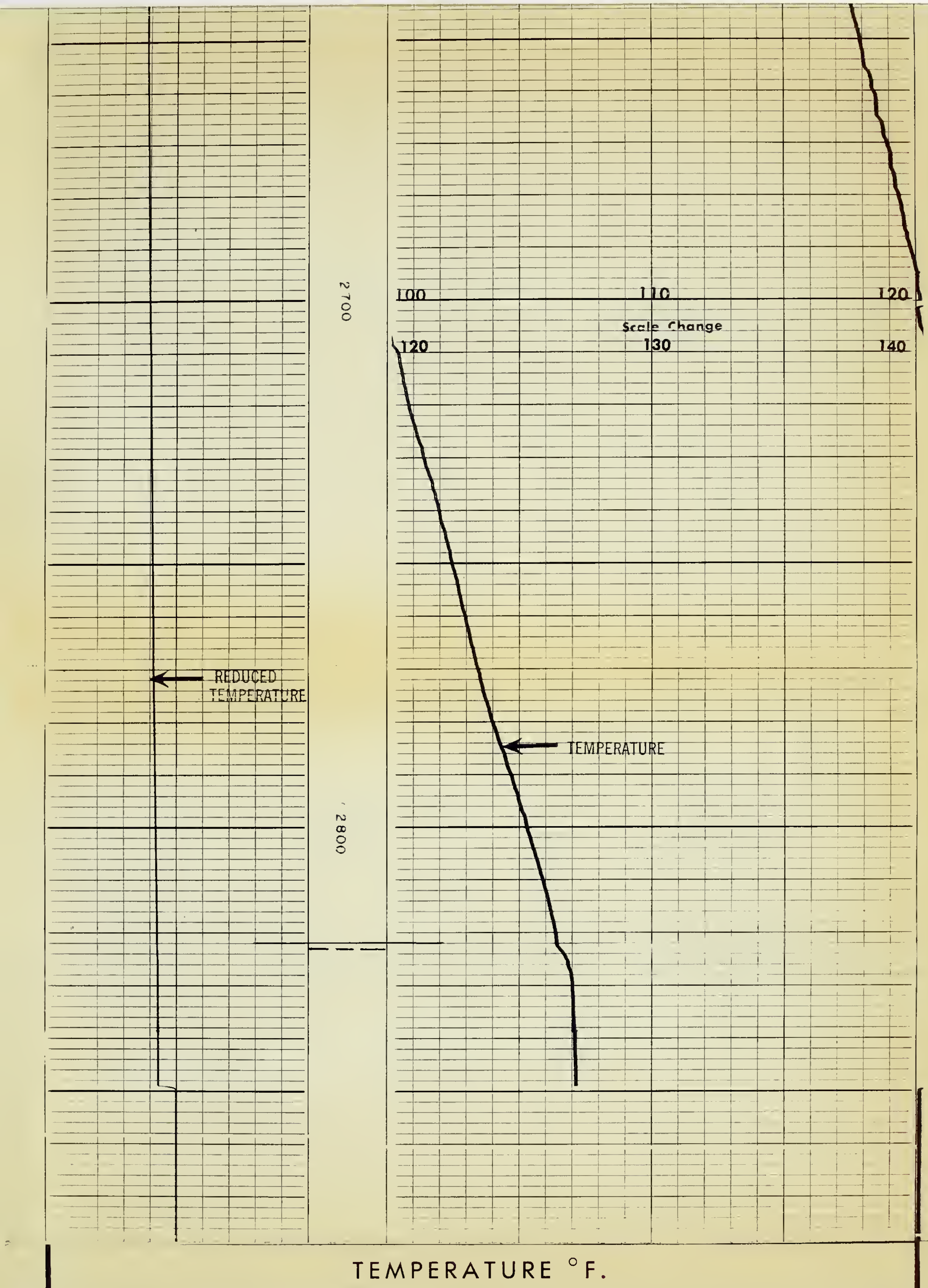

60
80
50
Scale Change
70
40
60
0
1500
1600


80
100
70
Scale Change
90
60
80
100
90
Scale Change
80
1700
1800
9


120
110
100
00
2000
2100


2200
2300


2400
2500
2600



COMPANY ATLANTIC RICHFIELD COMPANY
WELL SORGHUM GULCH #11
FIELD SORGHUM GULCH
COUNTY RIO BLANCO STATE COLORADO

SCHL. F. R. 2822
SCHL. T. D. 2823
DRLR. T. D. 2826

COREHOLE SG-18

THIS ENVELOPE CONTAINS THE FOLLOWING GEOPHYSICAL LOGS:

Schlumberger: Borehole Compensated Sonic
Laterolog
Formation Density
Temperature

II B-368

Schlumberger

BOREHOLE COMPENSATED SONIC LOG

COUNTY RIO BLANCO
FIELD or LOCATION SORGHUM GULCH
WELL SORGHUM GULCH #18
COMPANY ATLANTIC RICHFIELD

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #18

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

LOCATION: API Serial No.
1240' FSL & 366'-FEL
Sec. 25 Twp. 3S Rge. 97W

Other Services:
TEMP
LL-7
FDC-GR

Permanent Datum: GL ; Elev.: 7383
Log Measured From GL , 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B. ---
D.F. ----
G.L. 7383

Date	10-4-74			
Run No.	ONE			
Depth—Driller	1430			
Depth—Logger	1425			
Btm. Log Interval	1422			
Top Log Interval	530			
Casing—Driller	7 @ 60	@	@	@
Casing—Logger	-			
Bit Size	6 1/4			
Type Fluid in Hole	WATER			
Dens. | Visc.	- | -			
pH | Fluid Loss	- | - ml	ml	ml	ml
Source of Sample	-			
R_m @ Meas. Temp.	- @ - °F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	@ - °F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	- @ - °F	@ °F	@ °F	@ °F
Source: R_{mf} | R_{mc}	- | -			
R_m @ BHT	@ - °F	@ °F	@ °F	@
TIME Circulation Stopped	-			
	-			
Max. Rec. Temp.	82 °F	°F	°F	°F
Equip. | Location	7674 | VRNL			
Recorded By	HAUGAARD			
Witnessed By	TAIT			

The well name, location and borehole reference data were furnished by the customer.

FOLD HERE

Run No.	ONE		
Service Order No.	21443		
Fluid Level	529		

SCALE CHANGES

Type Log	Depth	Scale Up Hole	Scale Down Hole

EQUIPMENT DATA

Sonic Panel No.	JG 130	
Sonic Cart No.	EA 141	
Sonic Sonde No.	KB 161	
Mem. Panel No.	AD 173	
G.R. Cart. No.	E 98	
G.R. Panel No.	EA 355	
Caliper No.	D 62	
TTR No.	-	
Centralizers: No.	2	
Type	1 1/2	
Standoffs: No.	-	
Type	-	
Time Const.-Sec.	1	
Speed - F.P.M.	60	

LOGGING DATA

Δt_m	Δt_f	Cp	Porosity Selectors ø Scale	Depth From	Depth To

REMARKS

LOGGING SPEED - 3600 FPH

CALIBRATION DATA

GR	BKG. CPS	30	
	Source CPS	340	
	Tc Sec	1	

$$\text{Velocity (ft/sec)} = \frac{1{,}000{,}000}{\text{Interval Transit Time (microseconds per foot)}}$$

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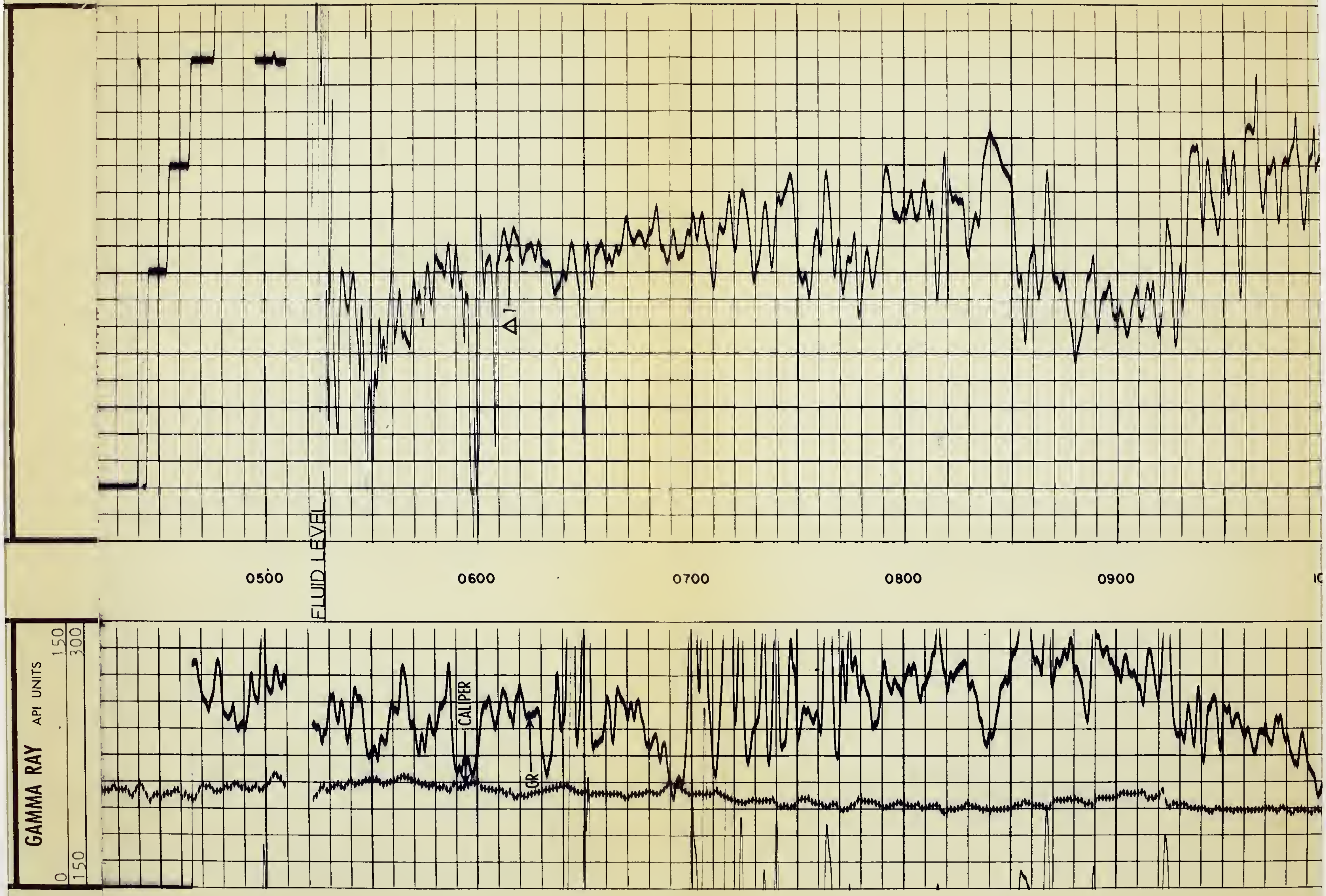
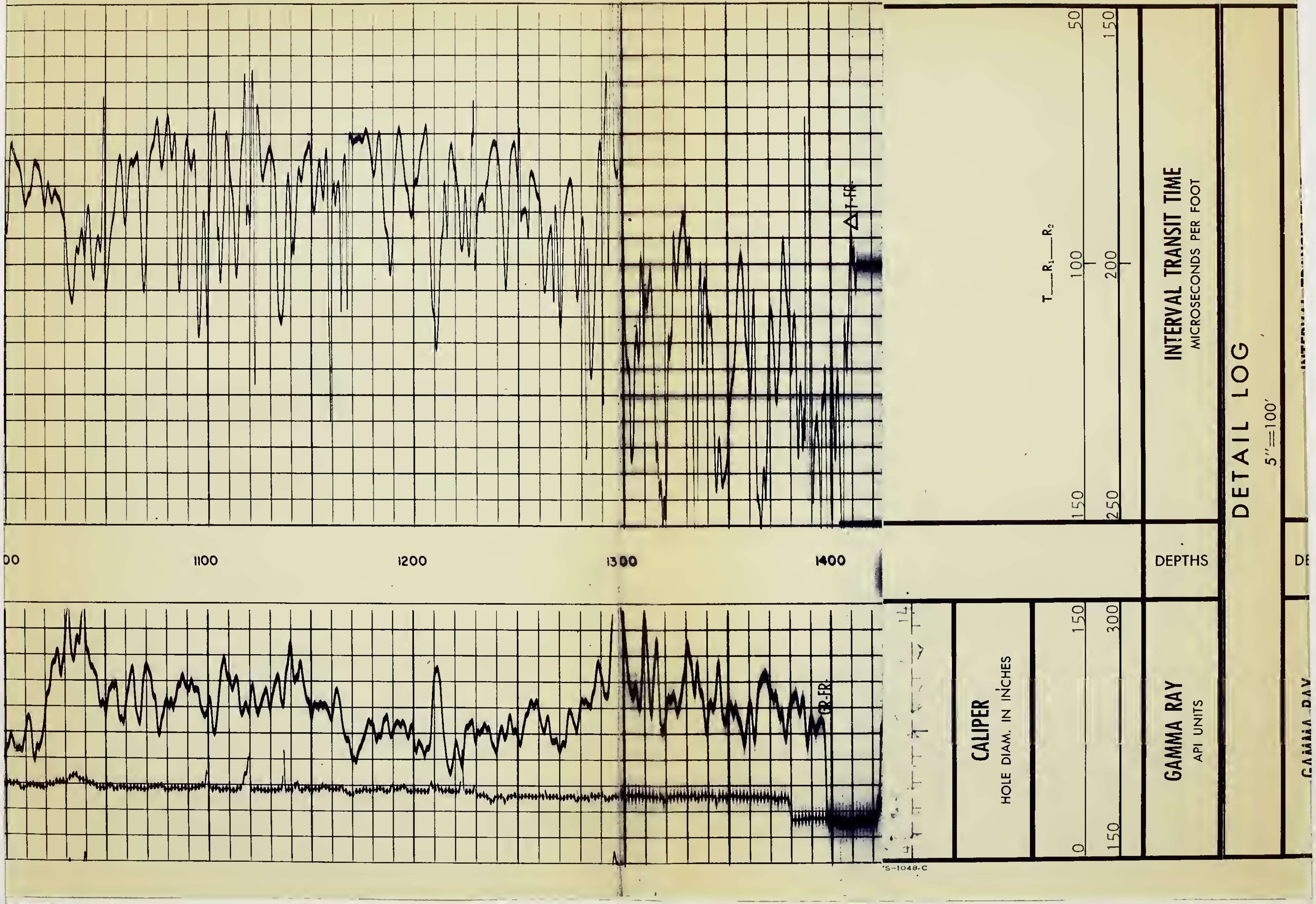
INTERVAL TRANSIT TIME MICROSECONDS PER FOOT T__ R1__ R2__
150 100 50
250 200 150

DEPTH

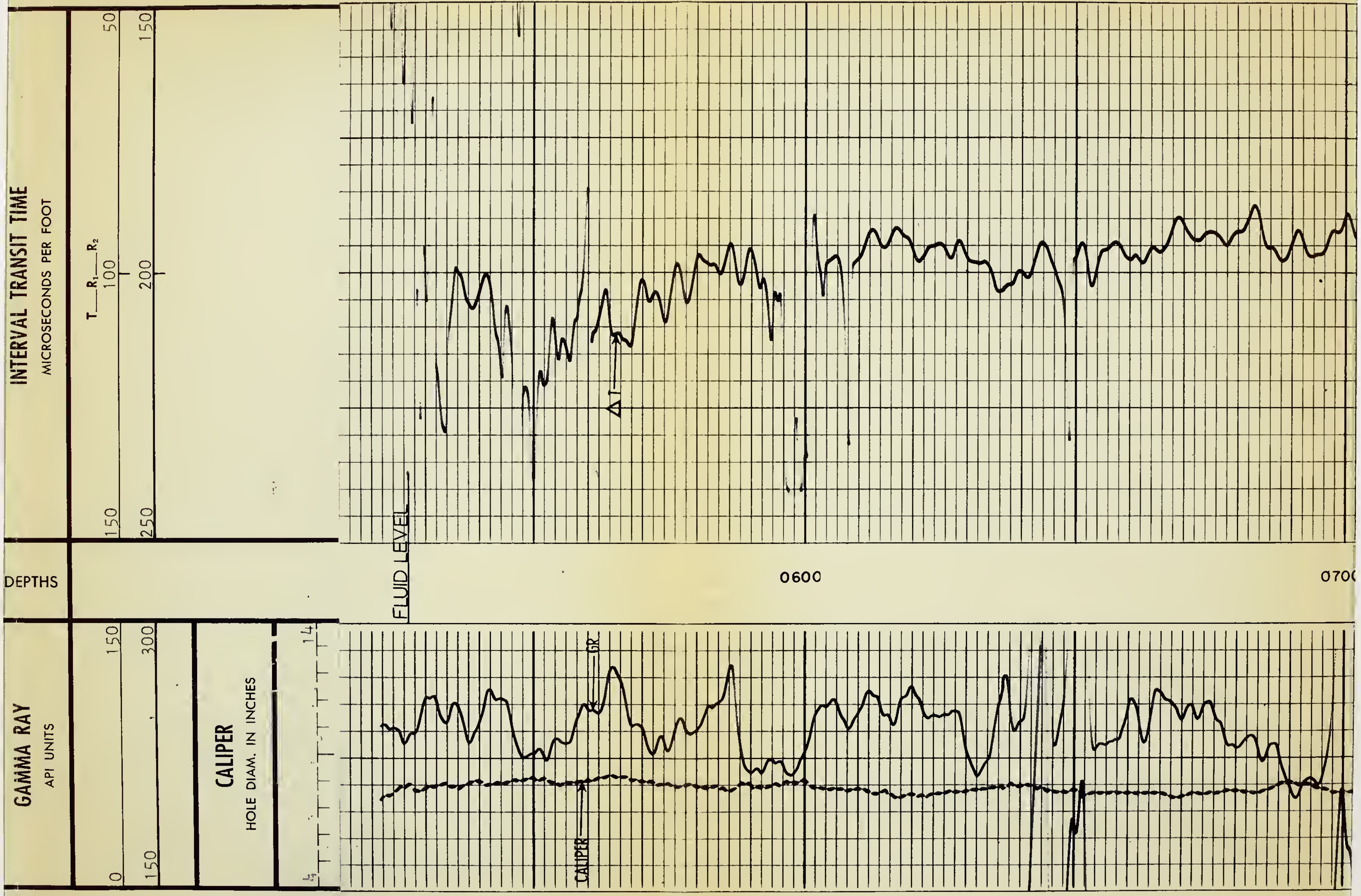
CALIPER DIAM. IN INCHES
4 14

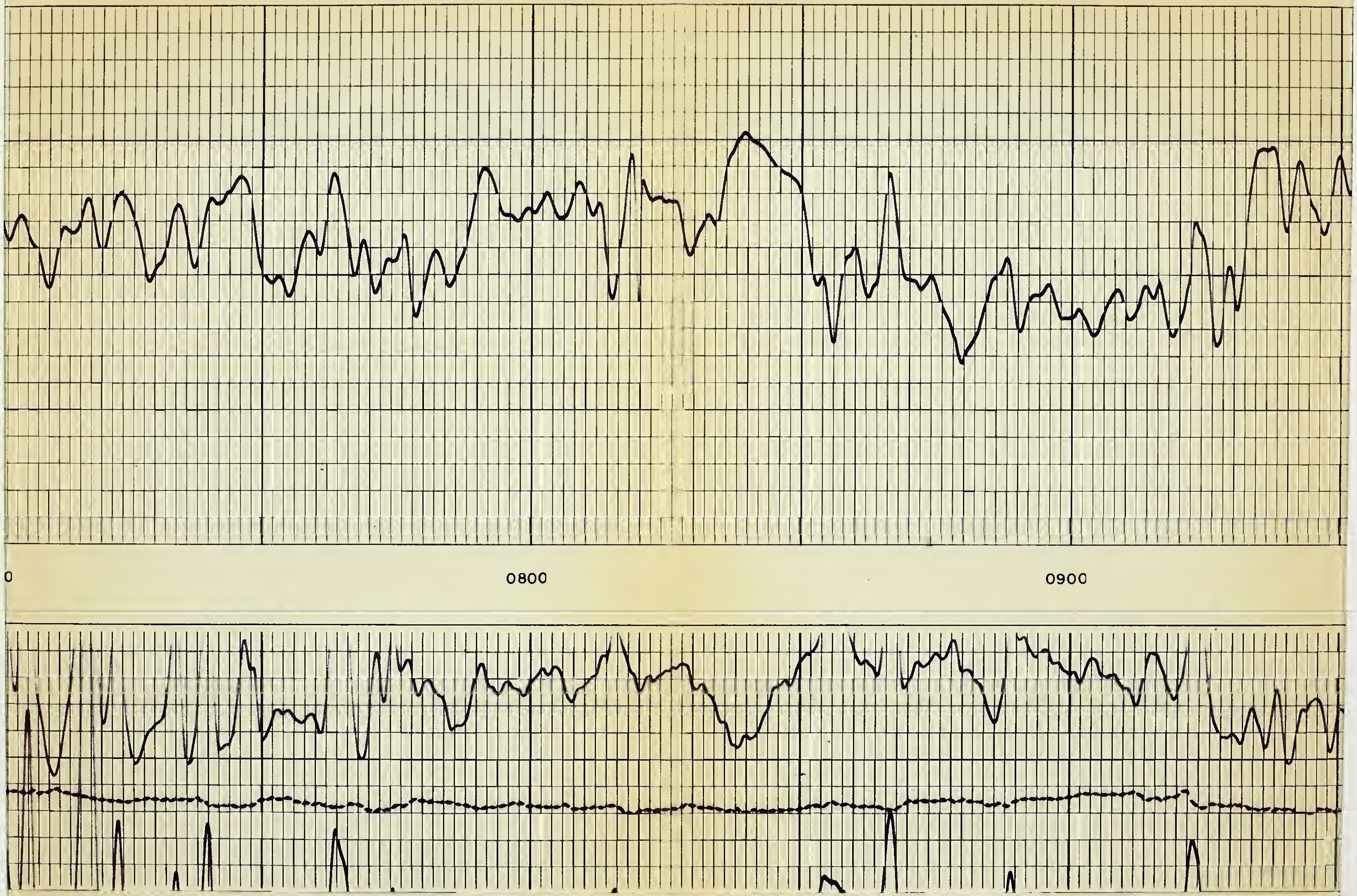


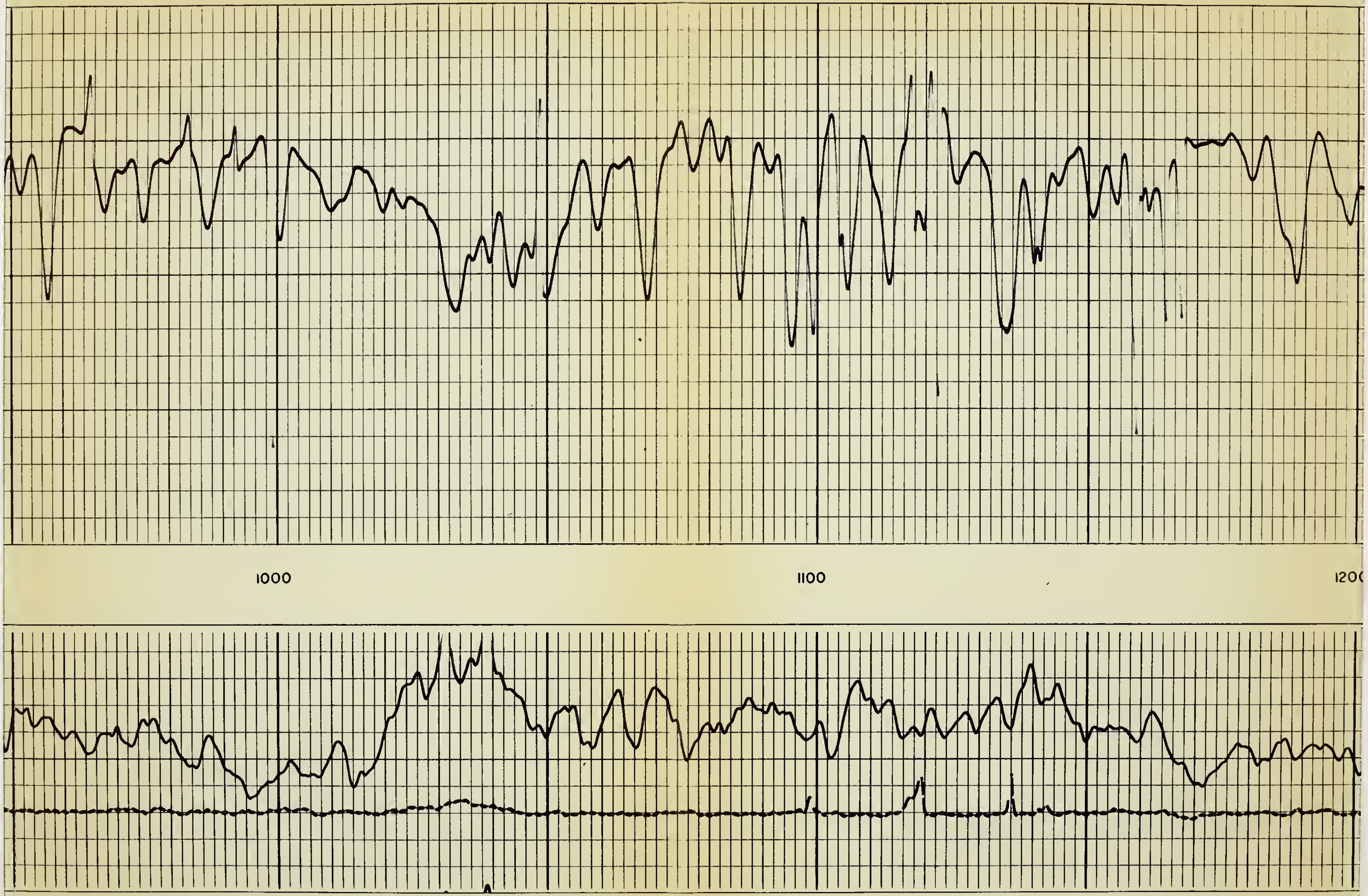
Δt
0500
FLUID LEVEL
0600
0700
0800
0900
10
GAMMA RAY API UNITS
0
150
150
300
CALIPER
GR

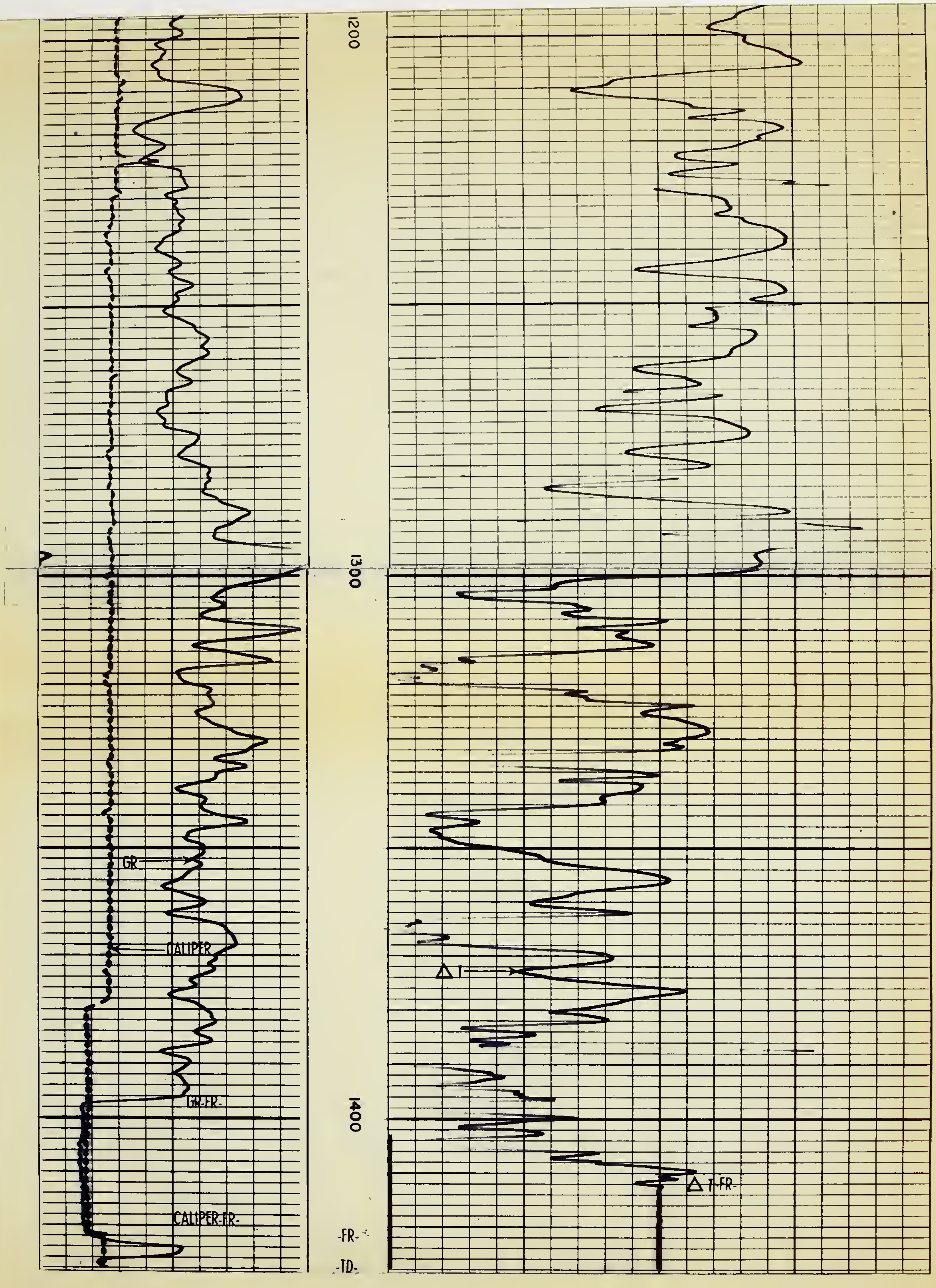


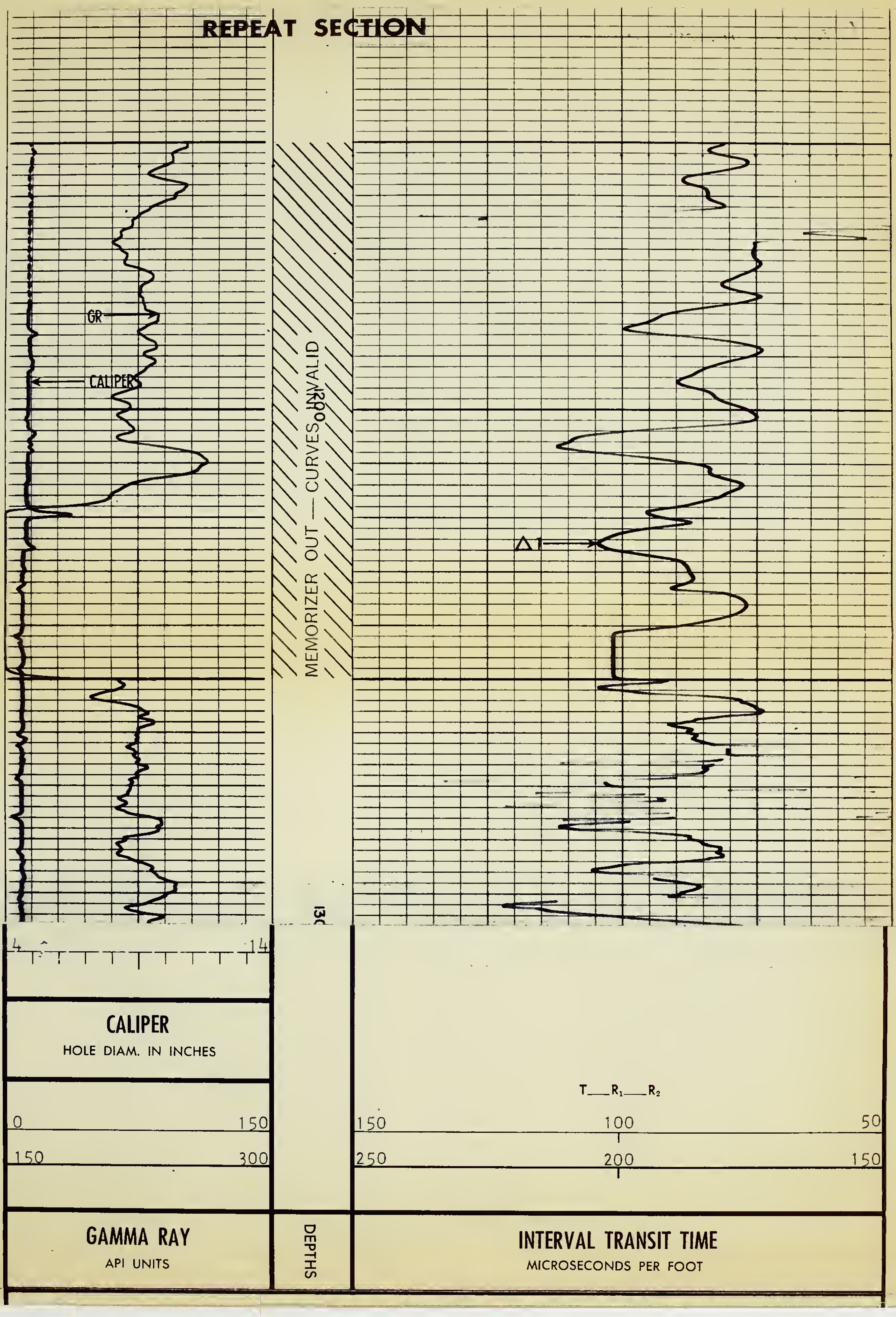
INTERVAL TRANSIT TIME
MICROSECONDS PER FOOT
T___R$_1$___R$_2$
50
100
150
150
200
250
T-FR
DEPTHS
00
1100
1200
1300
1400
DETAIL LOG
5″ = 100′
CALIPER
HOLE DIAM. IN INCHES
14
GAMMA RAY
API UNITS
0
150
150
300
GR-FR
S-1048-C


INTERVAL TRANSIT TIME
MICROSECONDS PER FOOT
T___R₁___R₂
50
100
150
150
200
250
ΔT
FLUID LEVEL
DEPTHS
0600
070
GAMMA RAY
API UNITS
150
0
300
150
CALIPER
HOLE DIAM. IN INCHES
14
4
GR
CALIPER


0
0800
0900


1000
1100
120

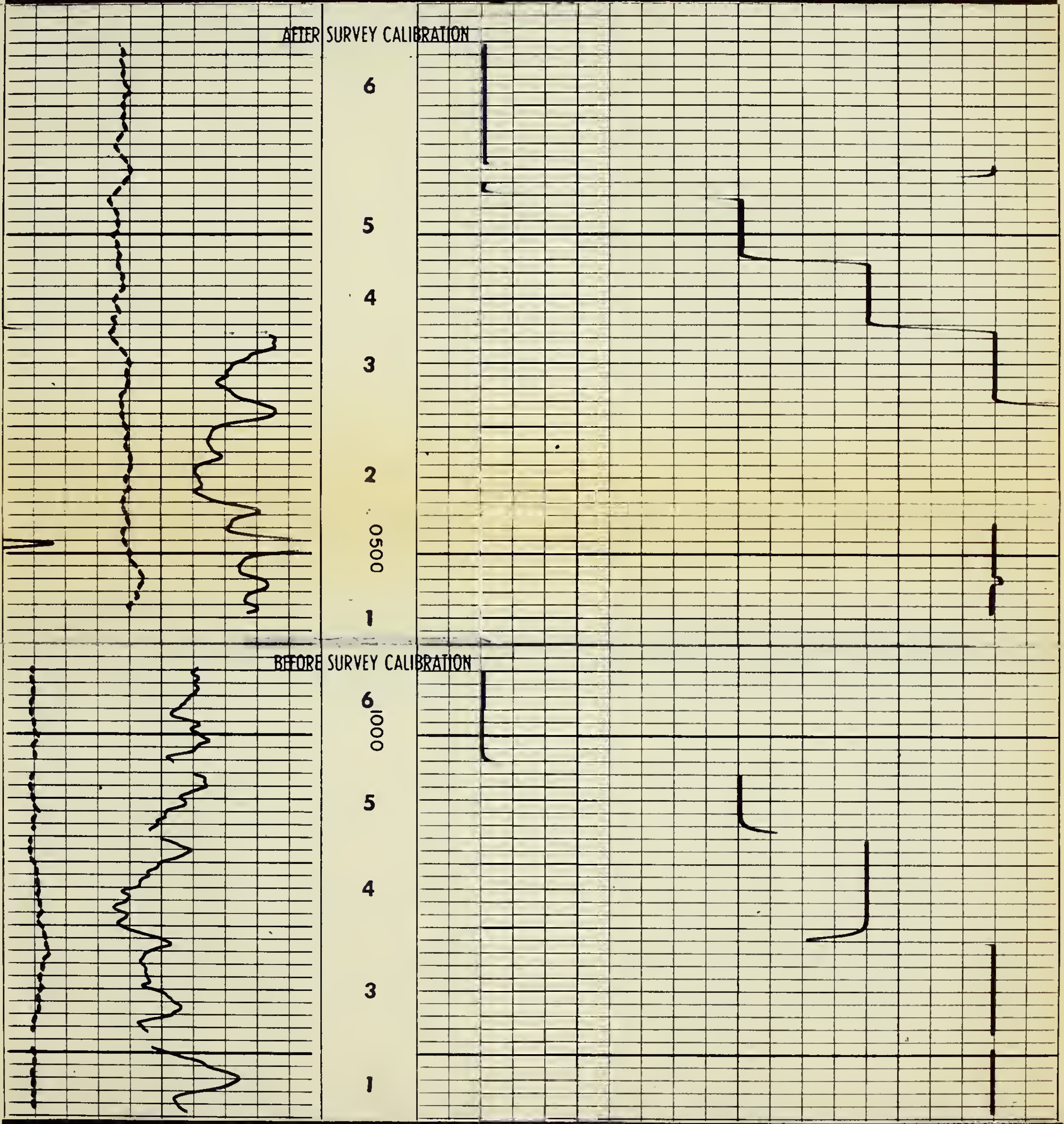

1200
1300
GR
CALIPER
ΔT
GR-FR-
1400
ΔT-FR-
CALIPER-FR-
-FR-
-TD-


REPEAT SECTION
GR
CALIPER
MEMORIZER OUT — CURVES INVALID
1200
ΔT
13C
4
14
CALIPER
HOLE DIAM. IN INCHES
0
150
150
300
GAMMA RAY
API UNITS
DEPTHS
T__R₁__R₂
150
100
50
250
200
150
INTERVAL TRANSIT TIME
MICROSECONDS PER FOOT

COMPANY ATLANTIC RICHFIELD
WELL SORGHUM GULCH #13
FIELD SORGHUM GULCH
COUNTY RIO BLANCO STATE COLORADO

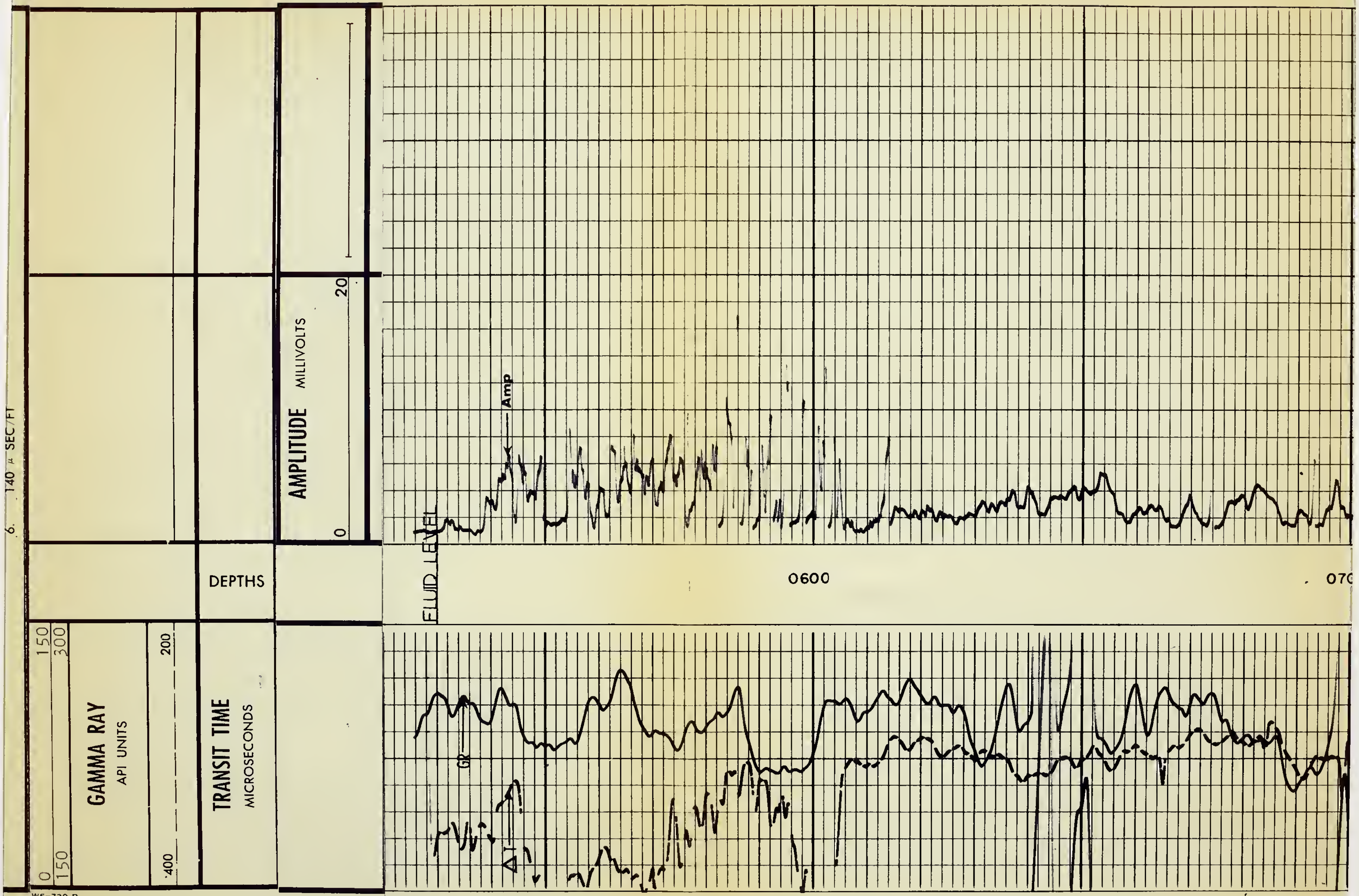
SCHL. FR 1422
SCHL. TD 1425
DRLR TD 1430
Elev:
KB ----
DF ----
GL 7383

CALIBRATION RECORD

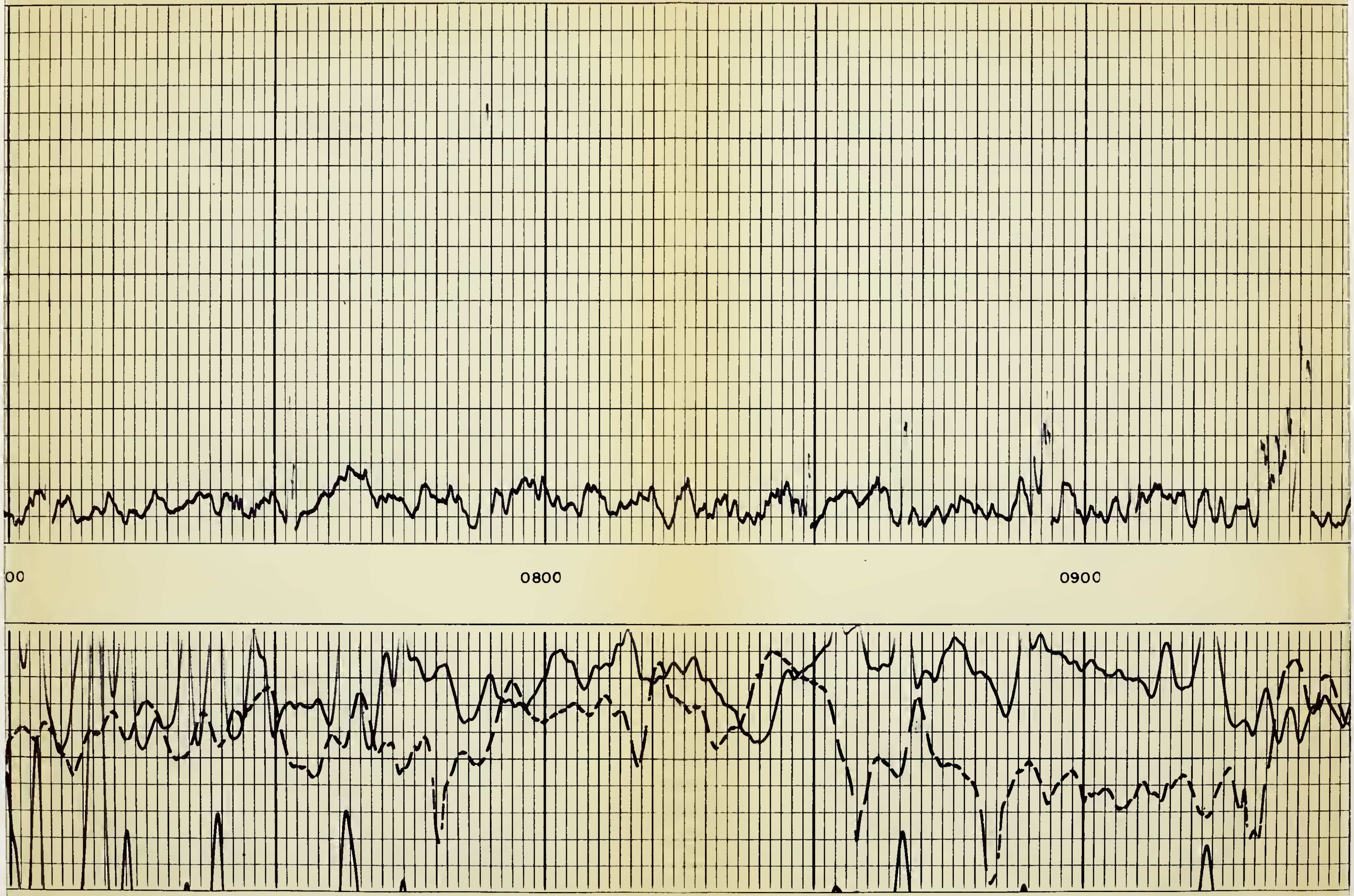


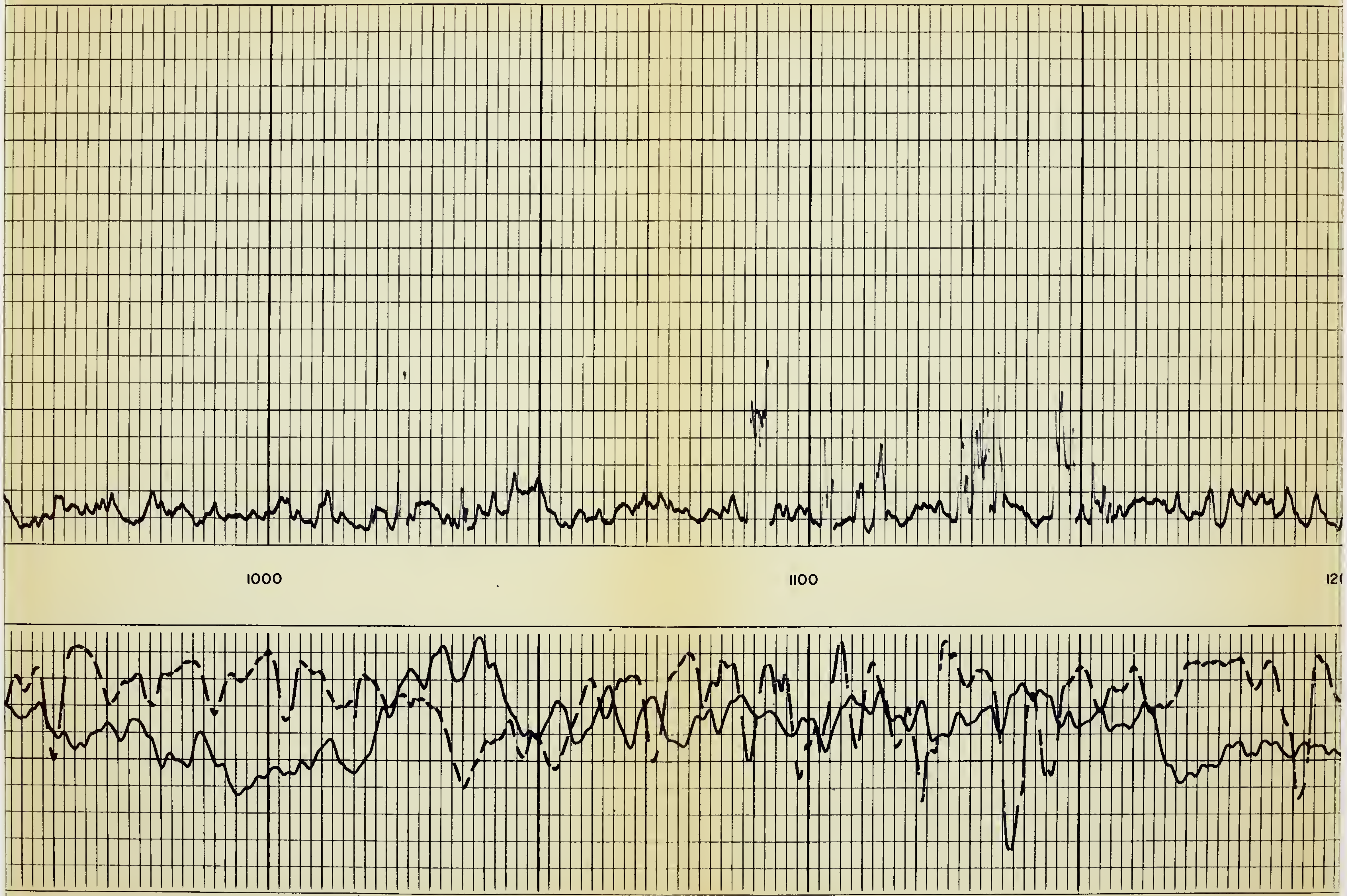
BOREHOLE COMPENSATED SONIC CALIBRATION CODING

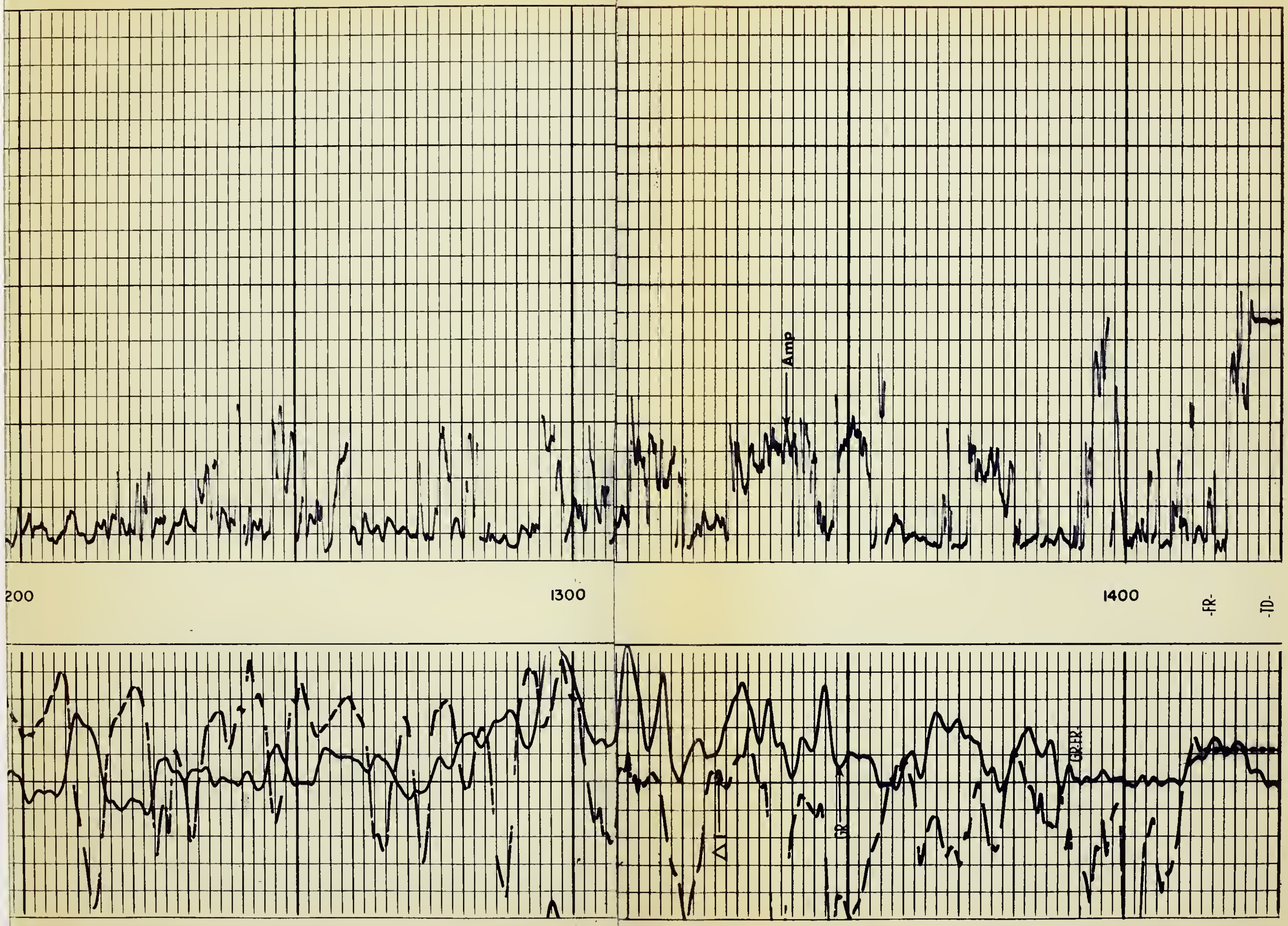
1. MECHANICAL ZERO
2. 40 μ SEC/FT
3. 60 μ SEC/FT
4. 80 μ SEC/FT
5. 100 μ SEC/FT
6. 140 μ SEC/FT

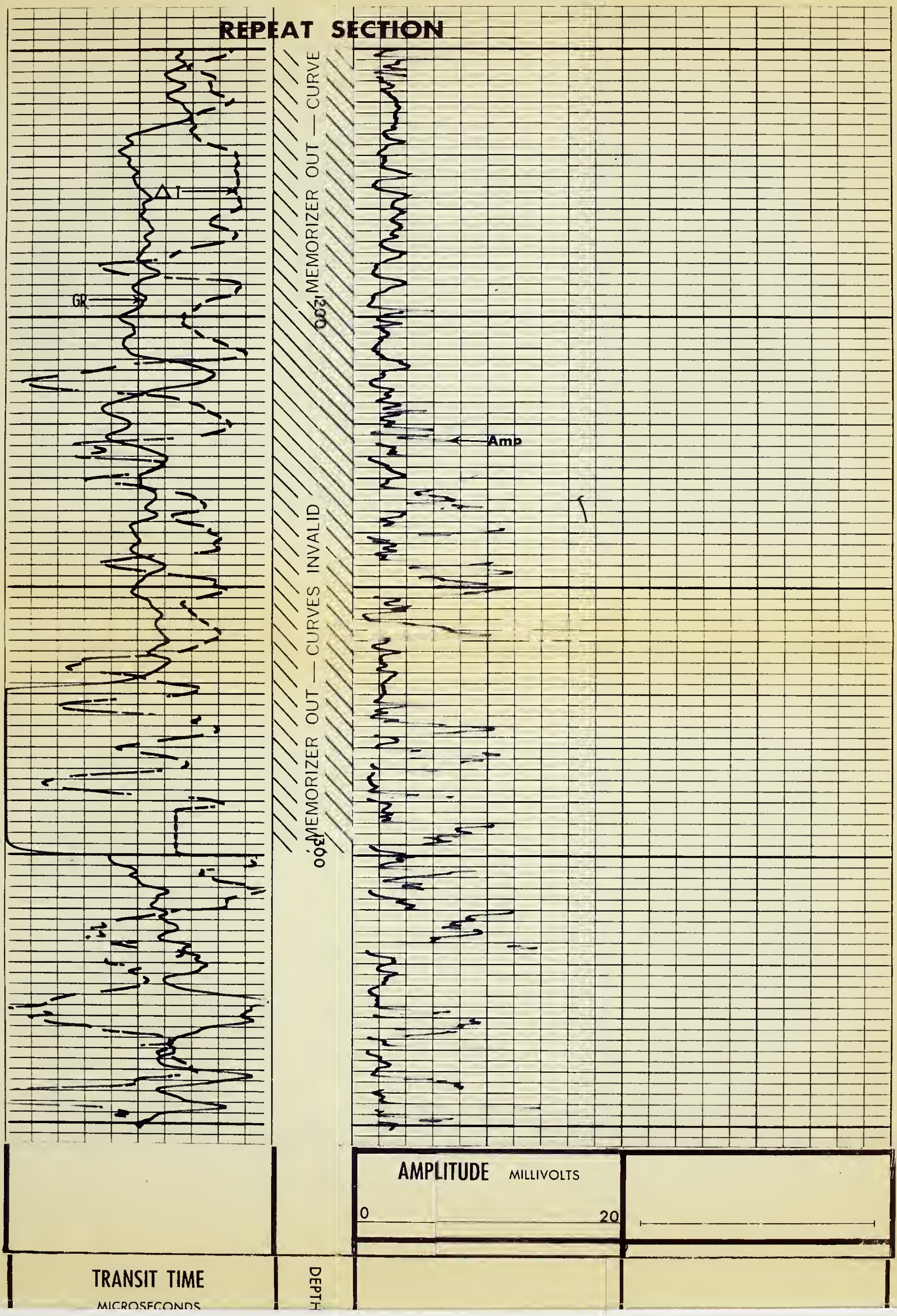

6. 140 μ SEC/FT
AMPLITUDE MILLIVOLTS
0
20
Amp
FLUID LEVEL
DEPTHS
0600
070
GAMMA RAY API UNITS
0
150
150
300
200
400
GR
TRANSIT TIME MICROSECONDS
ΔT

WS-730-D


00
0800
0900


1000
1100
12


Amp
200
1300
1400
-FR-
-TD-
ΔT
GR
GR.F.R.


REPEAT SECTION
MEMORIZER OUT — CURVE
1200
MEMORIZER OUT — CURVES INVALID
1300
ΔT
GR
Amp
AMPLITUDE MILLIVOLTS
0
20
TRANSIT TIME
MICROSECONDS
DEPTH

MICROSECONDS

400 200

GAMMA RAY

API UNITS

0 150

150 300

THS

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #18

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 1422

SCHL. TD 1425

DRLR TD 1430

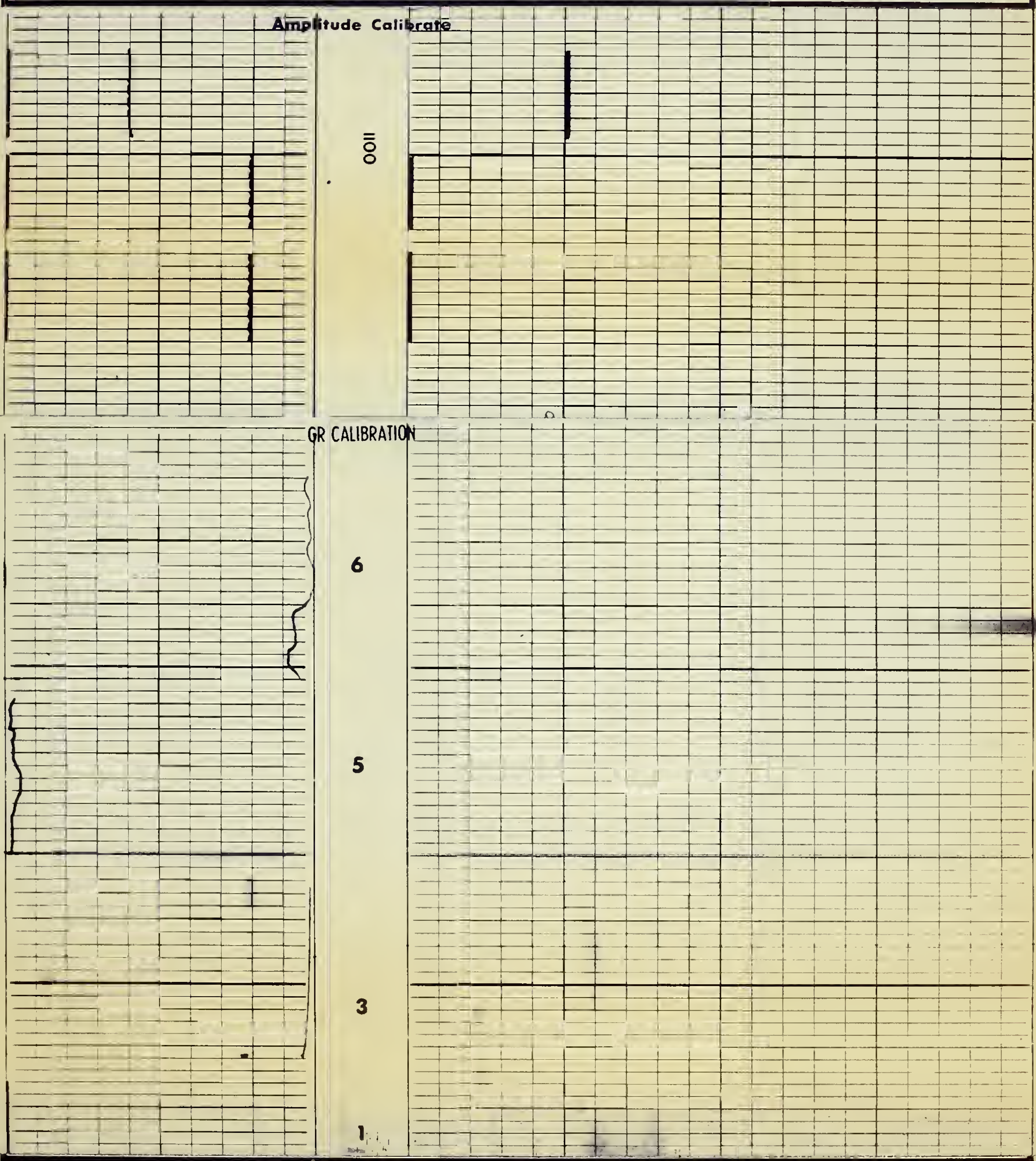
Elev:

KB ----

DF ----

GL 7383

CALIBRATION RECORD



GAMMA RAY CALIBRATION CODING

1. MECHANICAL ZERO
2. ELECTRICAL ZERO
3. RECORDER SENSITIVITY
4. MEMORIZER ADJUSTMENT
5. BACKGROUND
6. CALIBRATION

CALIBRATION RECORD

COMPANY ATLANTIC RIGHFIELD COMPANY

WELL SORGHUM GULCH #18

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 1422

SCHL. TD 1425

DRLR TD 1430

Elev:

KB ----

DF ----

GL 7383

Schlumberger

LATEROLOG
WITH GAMMA RAY

COUNTY RIO BLANCO
FIELD or LOCATION SORGHUM GULCH
WELL SORGHUM GULCH #18
COMPANY ATLANTIC RICHFIELD

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #18

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

LOCATION
1240' FSL & 366' FEL

Sec. 25 Twp. 3S Rge. 97W

Other Services:
TEMP
BHC-GR
FDC-GR

Permanent Datum: GL, Elev. 7383
Log Measured From GL, - Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B. ----
D.F. ----
G.L. 7383

Date	10-4-74			
Run No.	ONE			
Depth—Driller	1430			
Depth—Logger	1428			
Btm. Log Interval	1423			
Top Log Interval	529			
Casing—Driller	7 @ 60	@	@	@
Casing—Logger	-			
Bit Size	6 1/4			
Type Fluid in Hole	WATER -			
Dens. | Visc.	- | -			
pH | Fluid Loss	- | - ml	ml	ml	ml
Source of Sample	-			
R_m @ Meas. Temp.	- @ °F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	- @ °F	@ °F	@ °F	@ °F
R_m @ Meas. Temp.	- @ °F	@ °F	@ °F	@ °F
Source: R_{mf} R_{mc}	-			
R_m @ BHT	- @ °F	@ °F	@ °F	@ °F
Time Since Circ.				
Max. Rec. Temp.	82 °F	°F	°F	°F
Equip. | Location	7674 | VERNAL			
Recorded By	HAUGAARD			
Witnessed By	TAIT			

SWS-1360-F

The well name, location and borehole reference data were furnished by the customer.

FOLD HERE

REMARKS

Changes in Mud Type or Additional Samples

Date	Sample No.	Depth—Driller	Type Fluid in Hole	Dens. | Visc.	pH | Fluid Loss	Source of Sample	R_m @ Meas. Temp.	R_{mf} @ Meas. Temp.	R_{mc} @ Meas. Temp.	Source: R_{mf} | R_{mc}	R_m @ BHT	R_{mf} @ BHT	R_{mc} @ BHT
					ml		@ °F	@ °F	@ °F		@ °F	@ °F	@ °F
							@ °F	@ °F	@ °F		@ °F	@ °F	@ °F

Scale Changes

Type Log	Depth	Scale Up Hole	Scale Down Hole

Equipment Data

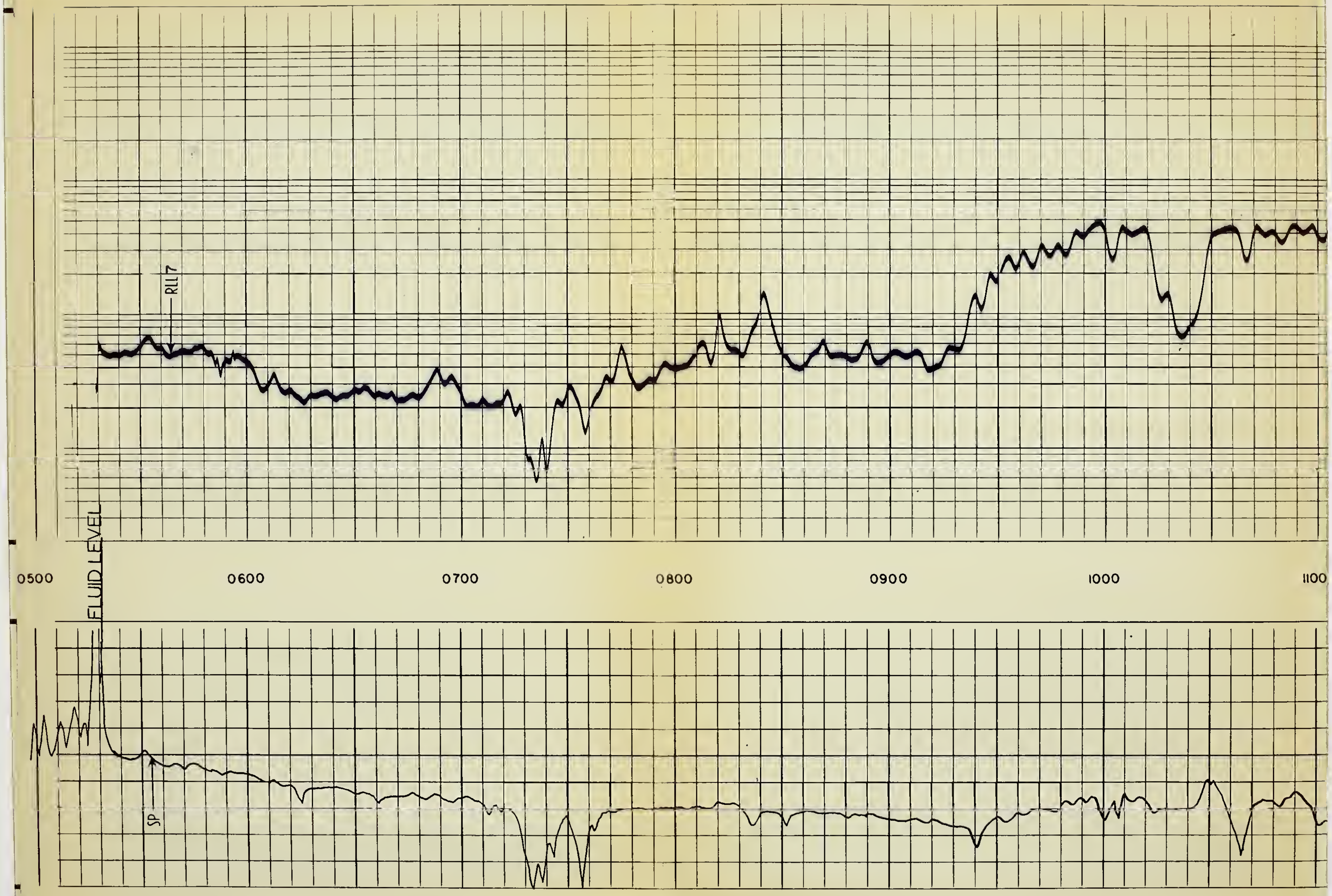
Run No.	Tool Type	Pad Type	Tool Pos.	Other
ONE	LL-7			

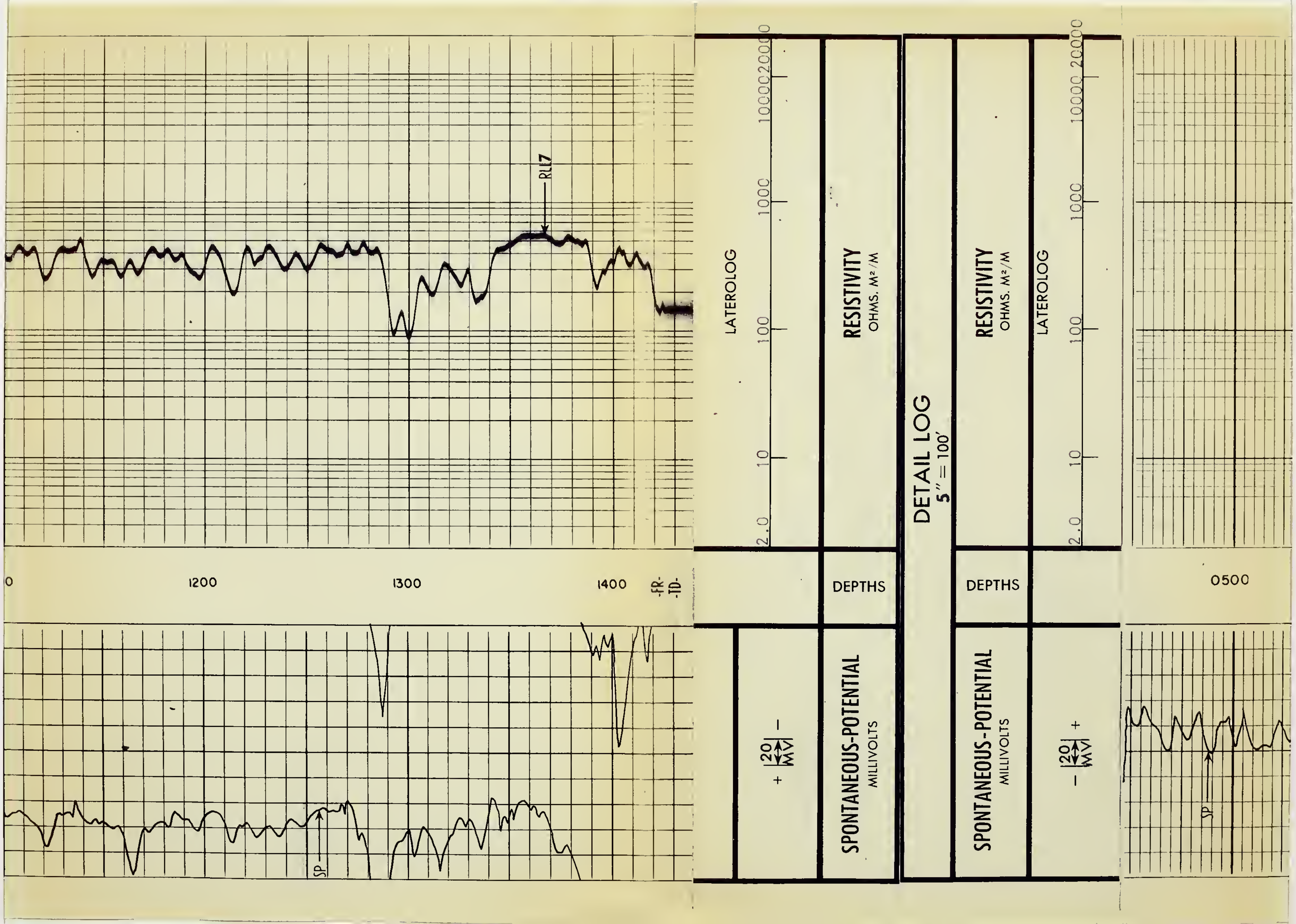
Equip. Used: CART. No. ----
PANEL No. LLP-D 790-E FFU-G 762
SONDE No.
Spacing: BEAM WIDTH:
GUARD LENGTH:
SERVICE ORDER # 21443

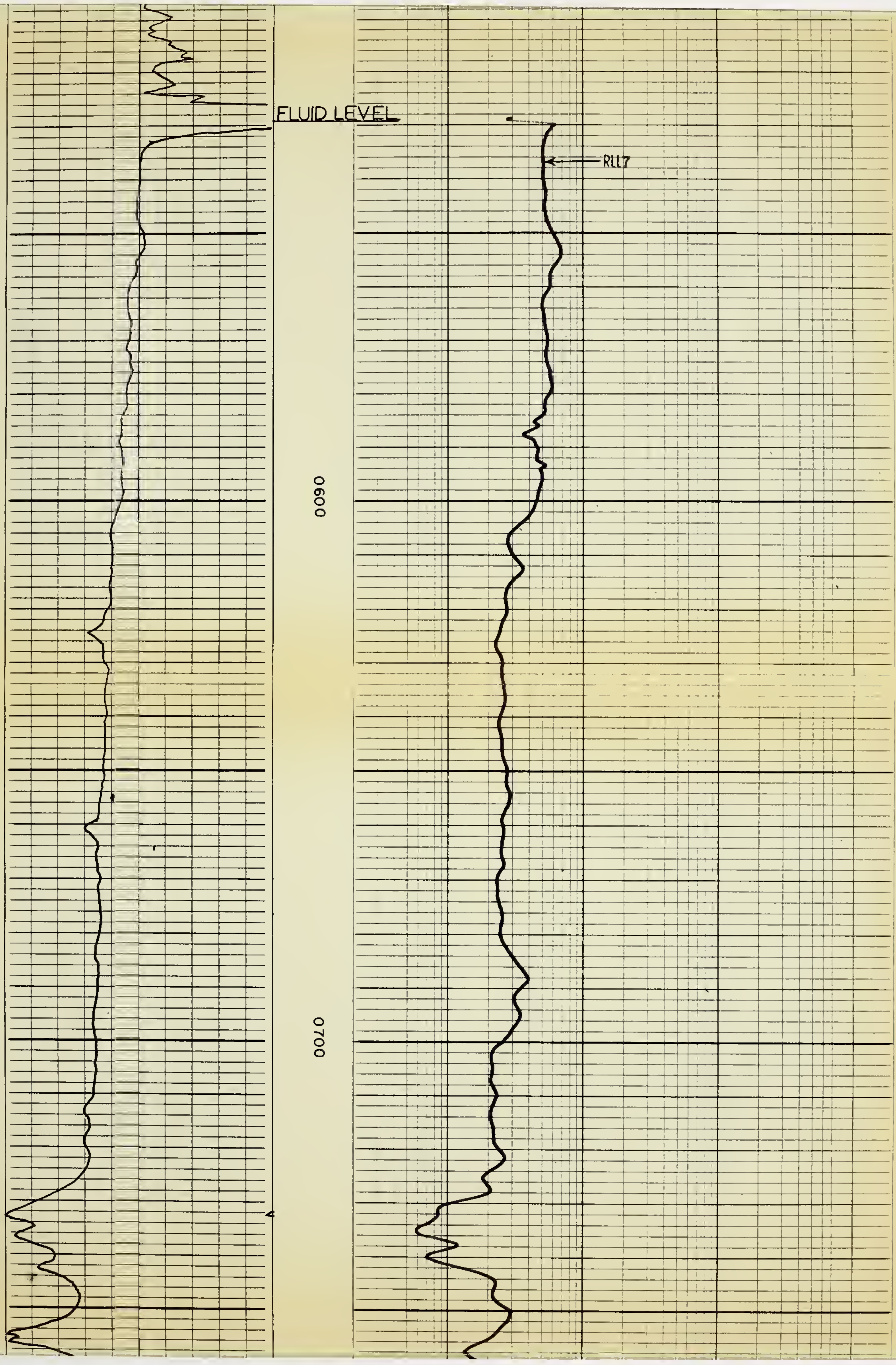
RESISTIVITY
ohms. m²/m
LATEROLOG
2 10 100 1000 10000 20000

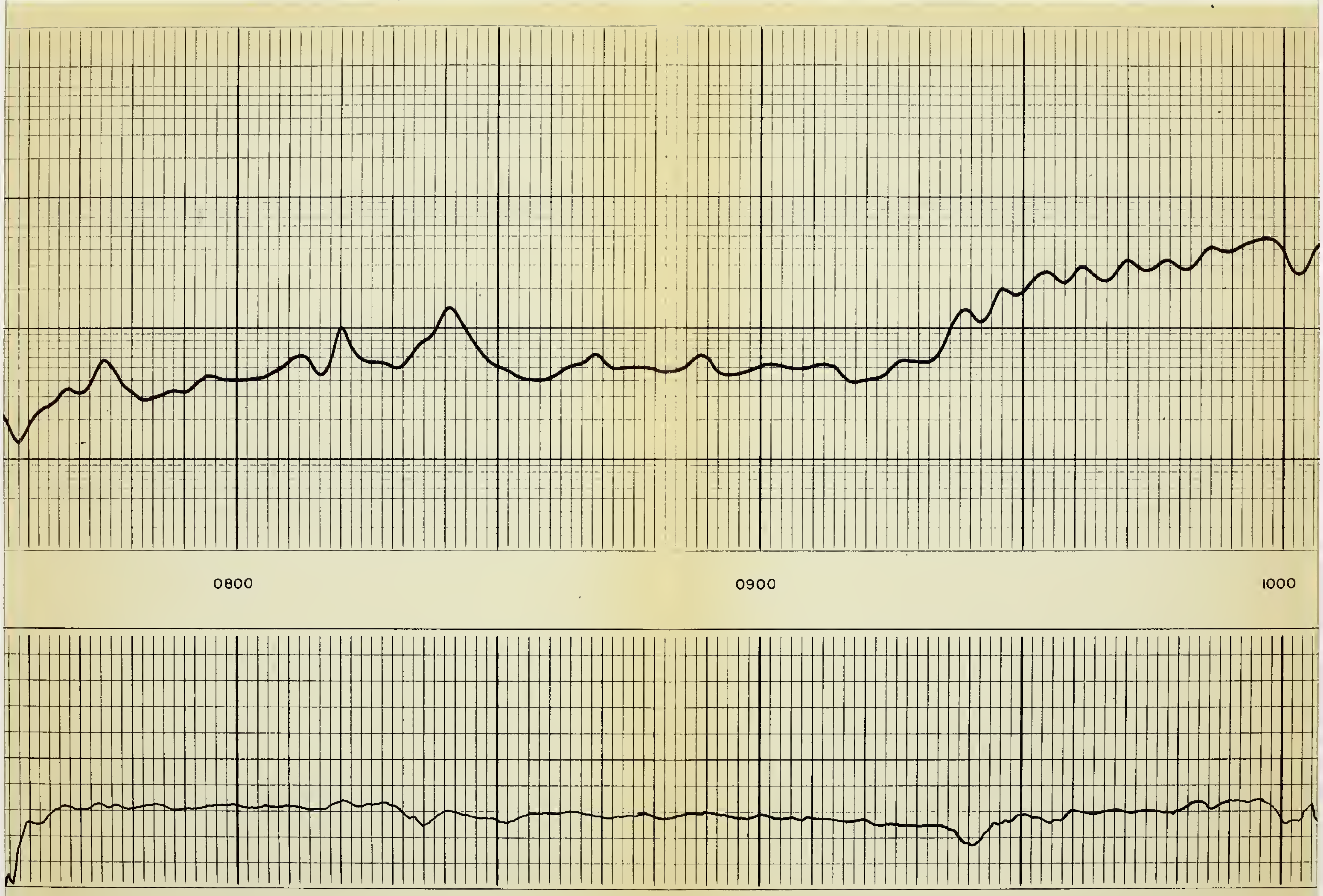
Depths

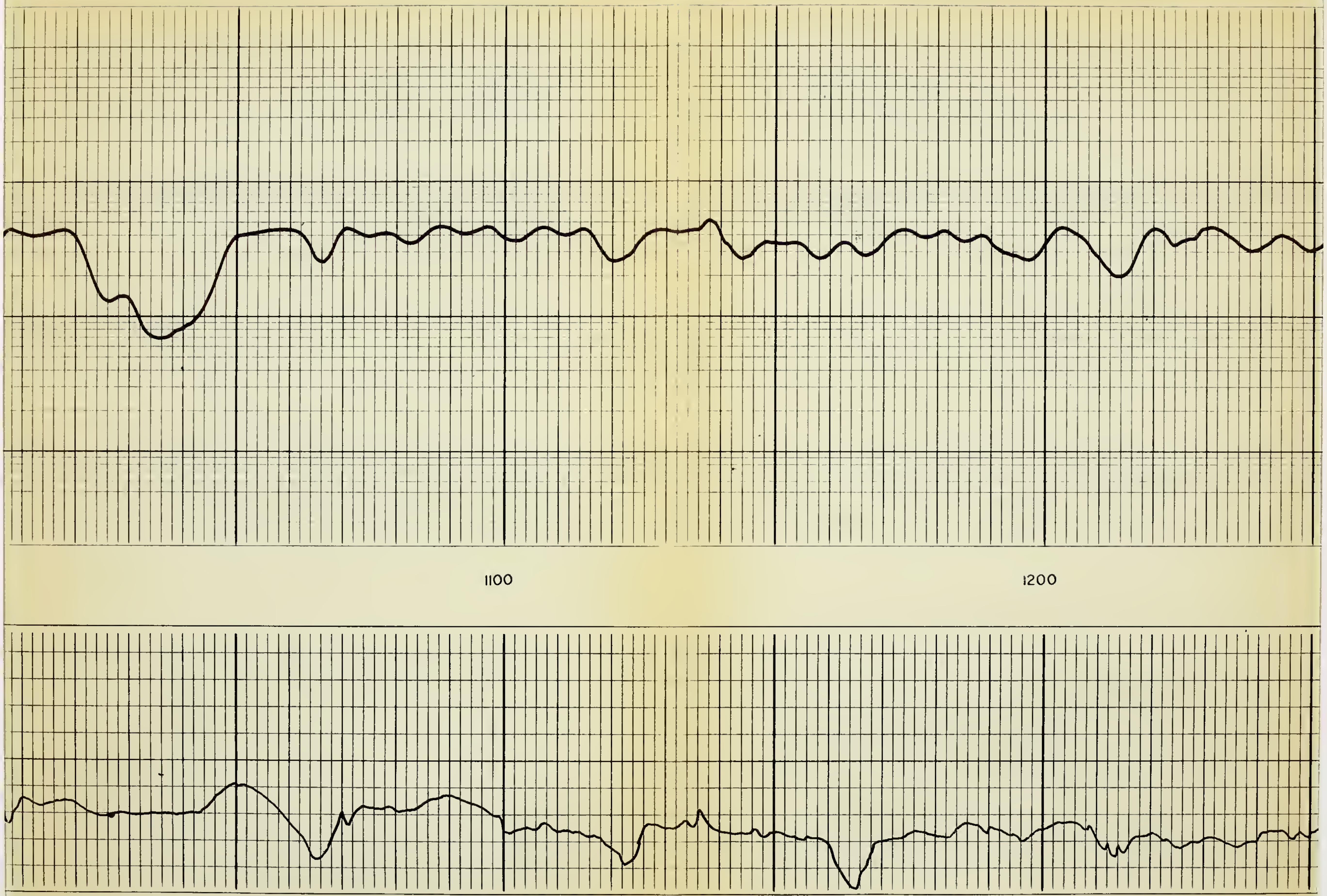
SPONTANEOUS POTENTIAL
millivolts
− 20 MV +

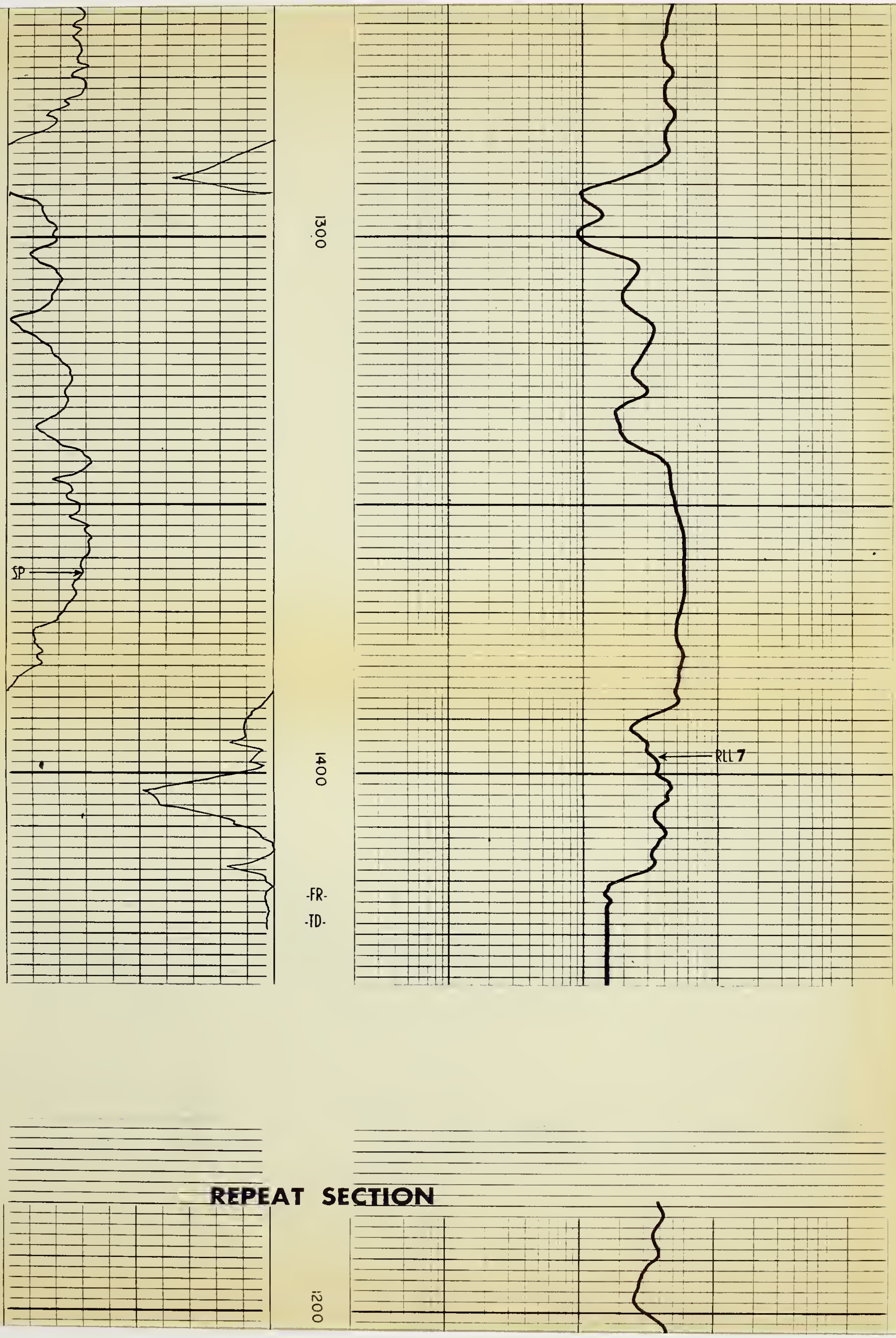

RLL7
FLUID LEVEL
0500
0600
0700
0800
0900
1000
1100
SP

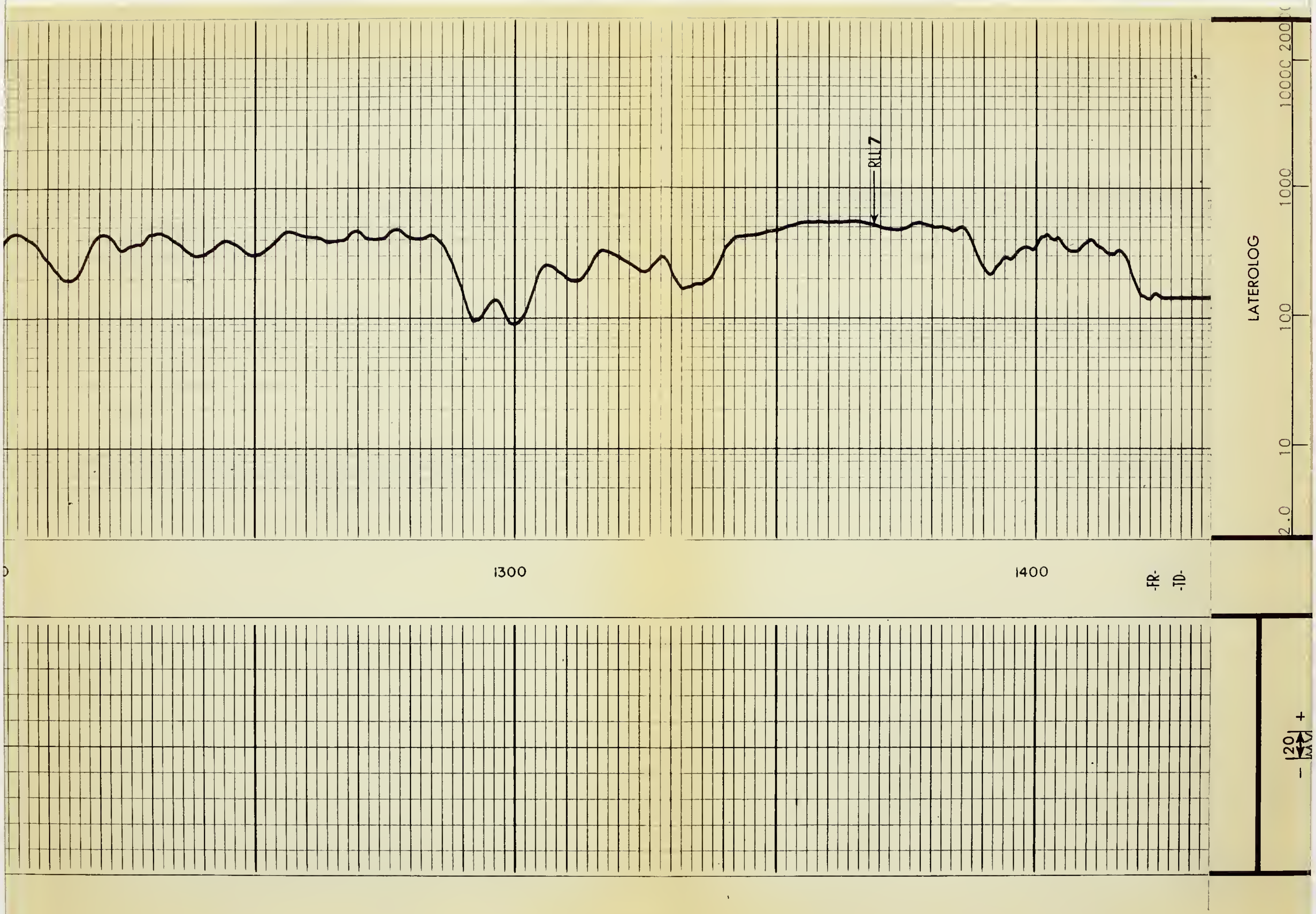

RL17
SP
0
1200
1300
1400
-FR-
-TD-
LATEROLOG
2.0
10
100
1000
10000
20000
RESISTIVITY
OHMS. M²/M
DEPTHS
+ 20 MV −
SPONTANEOUS-POTENTIAL
MILLIVOLTS
DETAIL LOG
5" = 100'
RESISTIVITY
OHMS. M²/M
LATEROLOG
2.0
10
100
1000
10000
20000
DEPTHS
SPONTANEOUS-POTENTIAL
MILLIVOLTS
− 20 MV +
0500
SP


FLUID LEVEL
RLL7
0600
0700


0800
0900
1000


1100
1200


SP
1300
1400
-FR-
-TD-
RLL7
REPEAT SECTION
1200

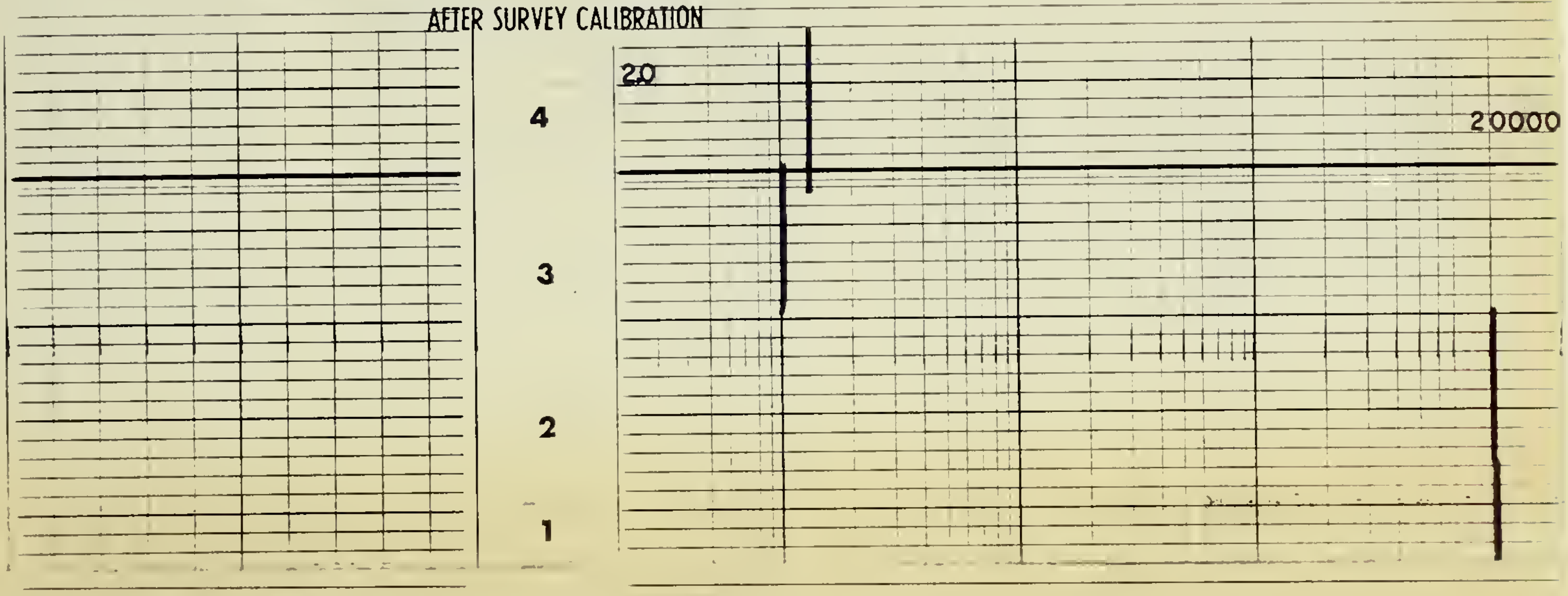

LATEROLOG
2.0
10
100
1000
10000
20000
RLL7
1300
1400
-FR-
-TD-
20 MV
+
-

SPONTANEOUS-POTENTIAL MILLIVOLTS	DEPTHS	RESISTIVITY OHMS. M²/M

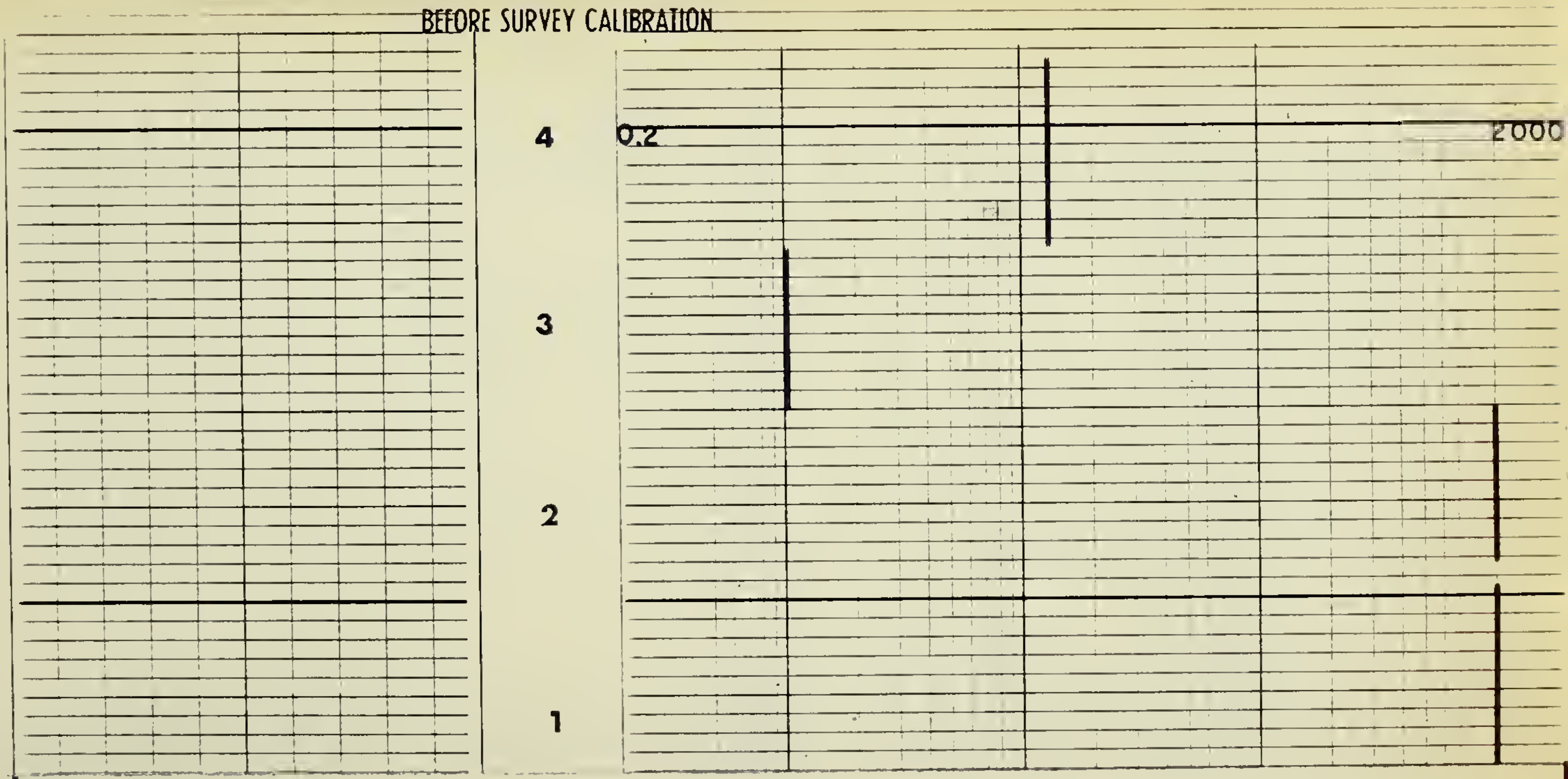
COMPANY ATLANTIC RICHFIELD COMPANY
WELL SORGHUM GULCH #18
FIELD SORGHUM GULCH
COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 1423
SCHL. TD 1428
DRLR TD 1430
Elev: KB ----
DF ----
GL 7383

AFTER SURVEY CALIBRATION



BEFORE SURVEY CALIBRATION



LATEROLOG CALIBRATION CODING

1. MECHANICAL ZERO
2. TEST-1 (1000 OHM-M)
3. TEST-2 (1 OHM-M)
4. TOOL CAL. (13.4 OHM-M)

CALIBRATION RECORD

COMPANY ATLANTIC RICHFIELD COMPANY
WELL SORGHUM GULCH #18
FIELD SORGHUM GULCH
COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 1423
SCHL. TD 1428
DRLR TD 1430
Elev: KB ----
DF ----
GL 7383

SWS–1938-B

Schlumberger

COMPENSATED FORMATION DENSITY LOG
Gamma-Gamma

COUNTY RIO BLANCO
FIELD or LOCATION SORGHUM GULCH
WELL SORGHUM GULCH #18
COMPANY ATLANTIC RICHFIELD

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #18

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

Location:
1240' FSL & 366' FEL
Sec. 25 Twp. 3S Rge. 97W

Other Services:
TEMP
BHC-GR
LL-7

Permanent Datum: GL ; Elev.: 7383
Log Measured From GL , 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B. ----
D.F. ----
G.L. 7383

Date	10-5-74			
Run No.	ONE			
Depth—Driller	1430			
Depth—Logger	1423			
Btm. Log Interval	1422			
Top Log Interval	64			
Casing—Driller	7 @60	@	@	@
Casing—Logger	64			
Bit Size	4 7/8			
Type Fluid in Hole	WATER			
Fluid Level	529			
Dens. | Visc.	- | -			
pH | Fluid Loss	- | - ml	ml	ml	ml
Source of Sample	-			
Rm @ Meas. Temp.	- @ - °F	@ °F	@ °F	@ °F
Rmf @ Meas. Temp.	- @ - °F	@ °F	@ °F	@ °F
Rmc @ Meas. Temp.	- @ - °F	@ °F	@ °F	@ °F
Source: Rmf | Rmc	- | -			
Rm @ BHT	- @ - °F	@ °F	@ °F	@ °F
Time Since Circ.	-			
Max. Rec. Temp.	82 °F	°F	°F	°F
Equip. | Location	7674 | VRNL			
Recorded By	HAUGAARD			
Witnessed By	TAIT			

The well name, location and borehole reference data were furnished by the customer

FOLD HERE

SCALE CHANGES

Type Log	Depth	Scale Up Hole	Scale Down Hole

LOGGING DATA

FDC Selectors

Liquid Density	Grain Density	Hole Fluid	Porosity Scale	From	To

REMARKS

Service Order No.
API Serial No. 21443
FILM SPLICED @1208

CHANGES IN MUD TYPE OR ADDITIONAL SAMPLES

Date		
Sample No.		
Depth - Driller		
Type Fluid		
Source of Sample		
Rm @ Meas. Temp.	@ °F	@ °F
Rmf @ Meas. Temp.	@ °F	@ °F
Rmc @ Meas. Temp.	@ °F	@ °F
Rm @ BHT	@ °F	@ °F
Dens. | Visc.		
ph | Fluid Loss	ml	ml
% Water by Vol.		
% Oil by Vol.		
% Solids by Vol.		
Solids Av. Sp. Gr.		

EQUIPMENT DATA

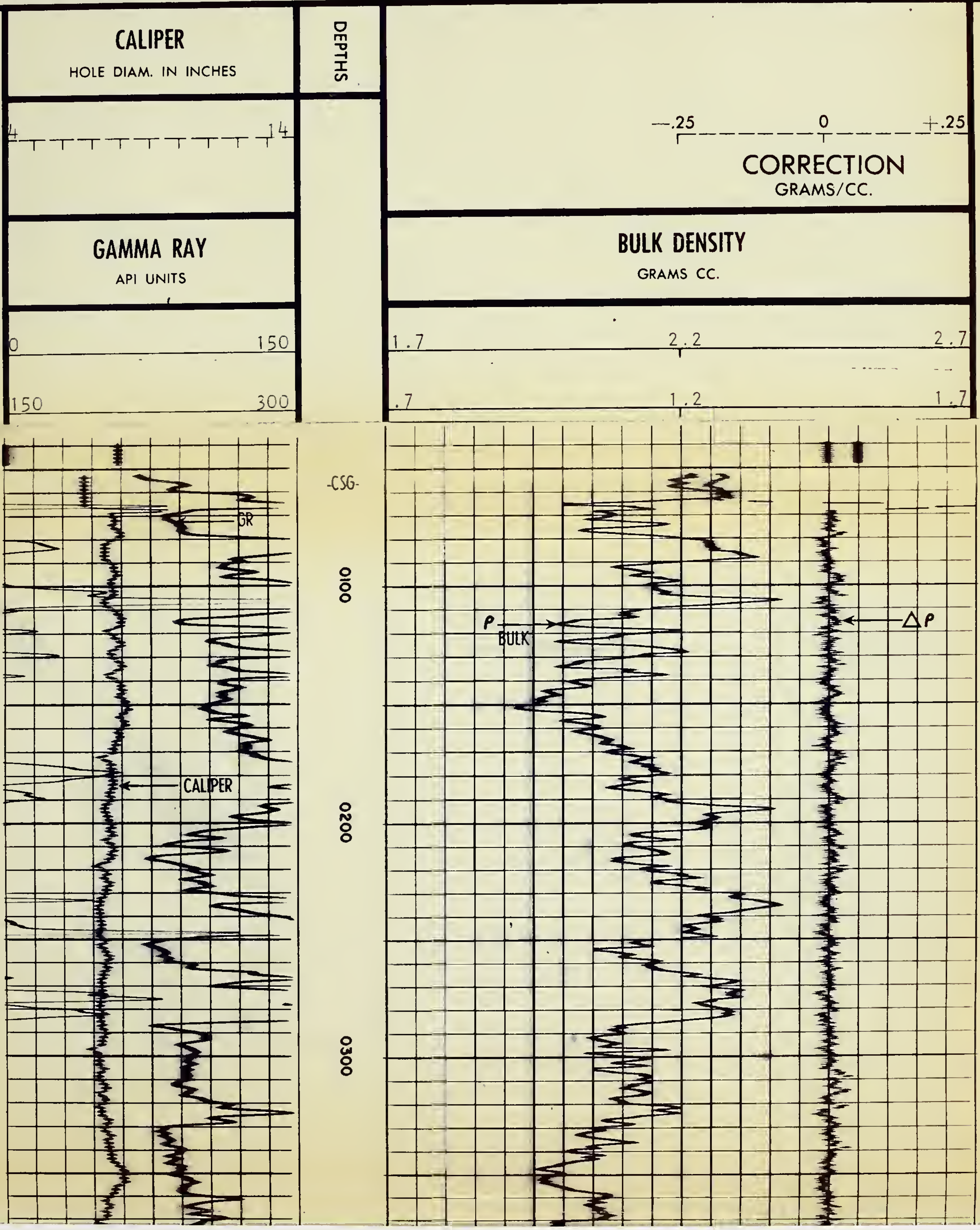
Run No.	ONE	
Panel No.	EA 355	
Cart No.	EA 333	
Skid No.	D 549	
Sonde No.	EB 235	
Source	B 2940	
Calibrator	T06 545	
GR Cart.	E 98	
TTR	-	
Mem Panel	AC 173	

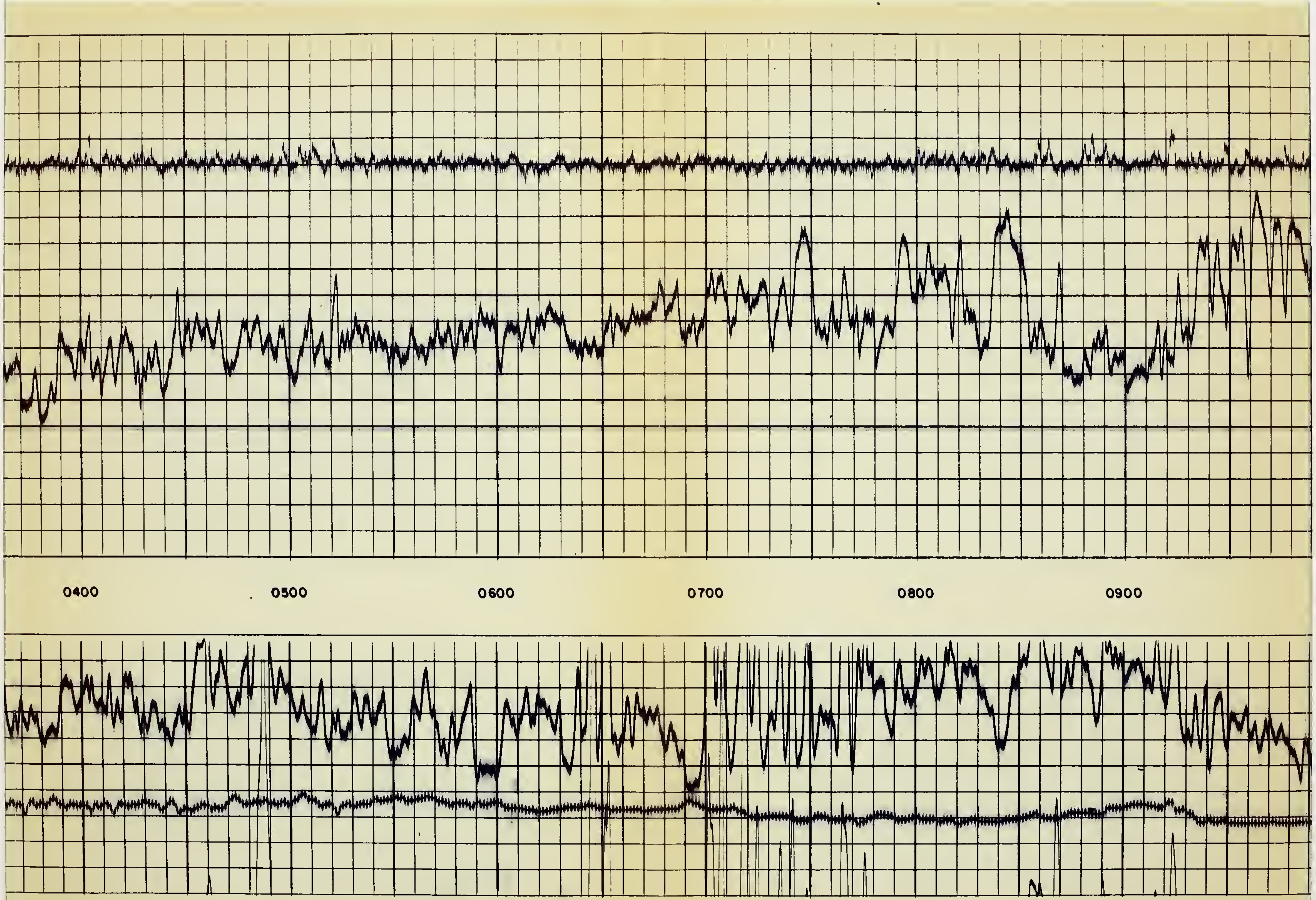
BIT SIZE/CASING DATA

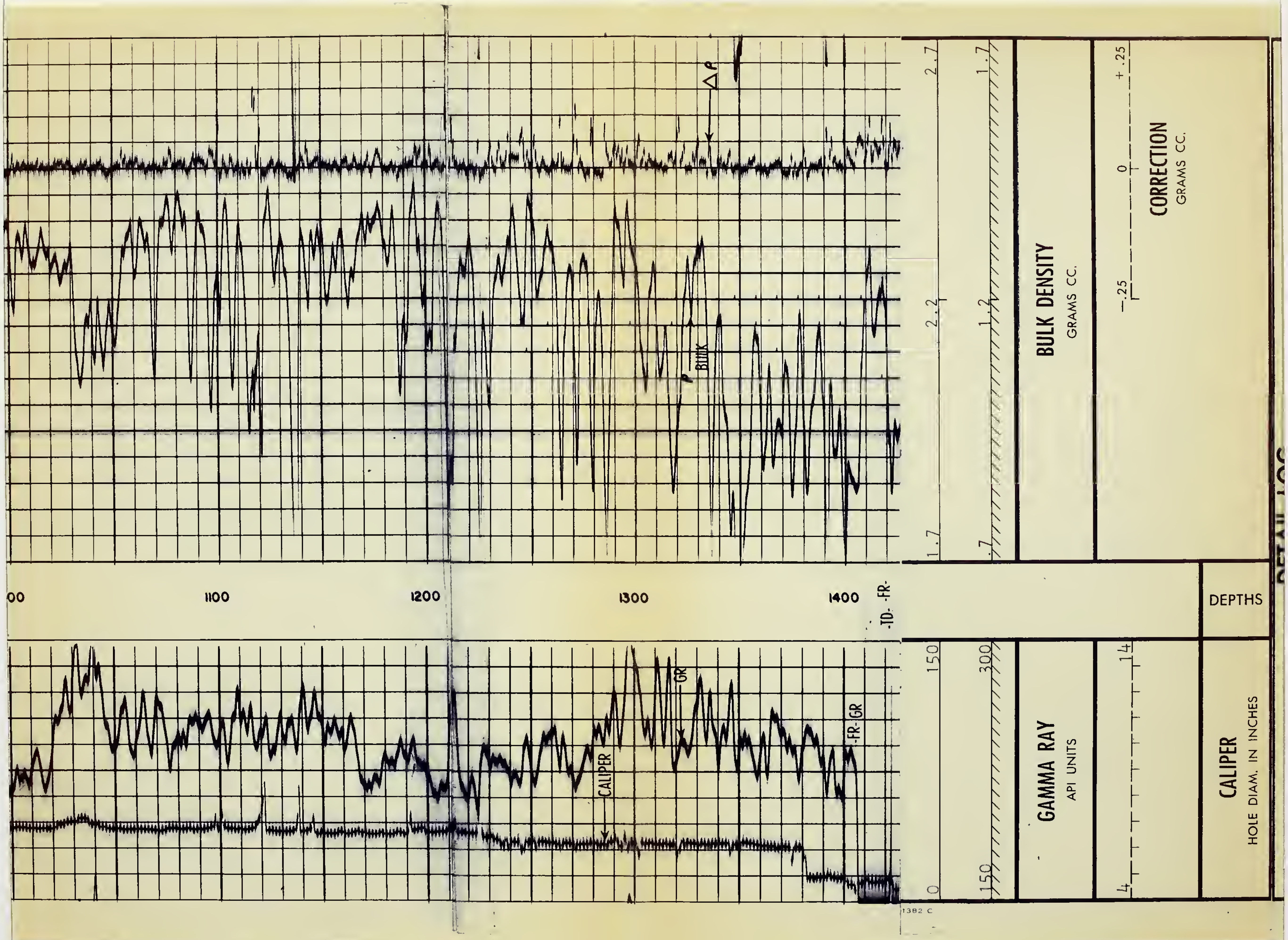
Bit	From	To	Csg. Size	Csg. Wt.	From	To
6¼	60	1380	7		GL	60
4 7/8	1380	1430				

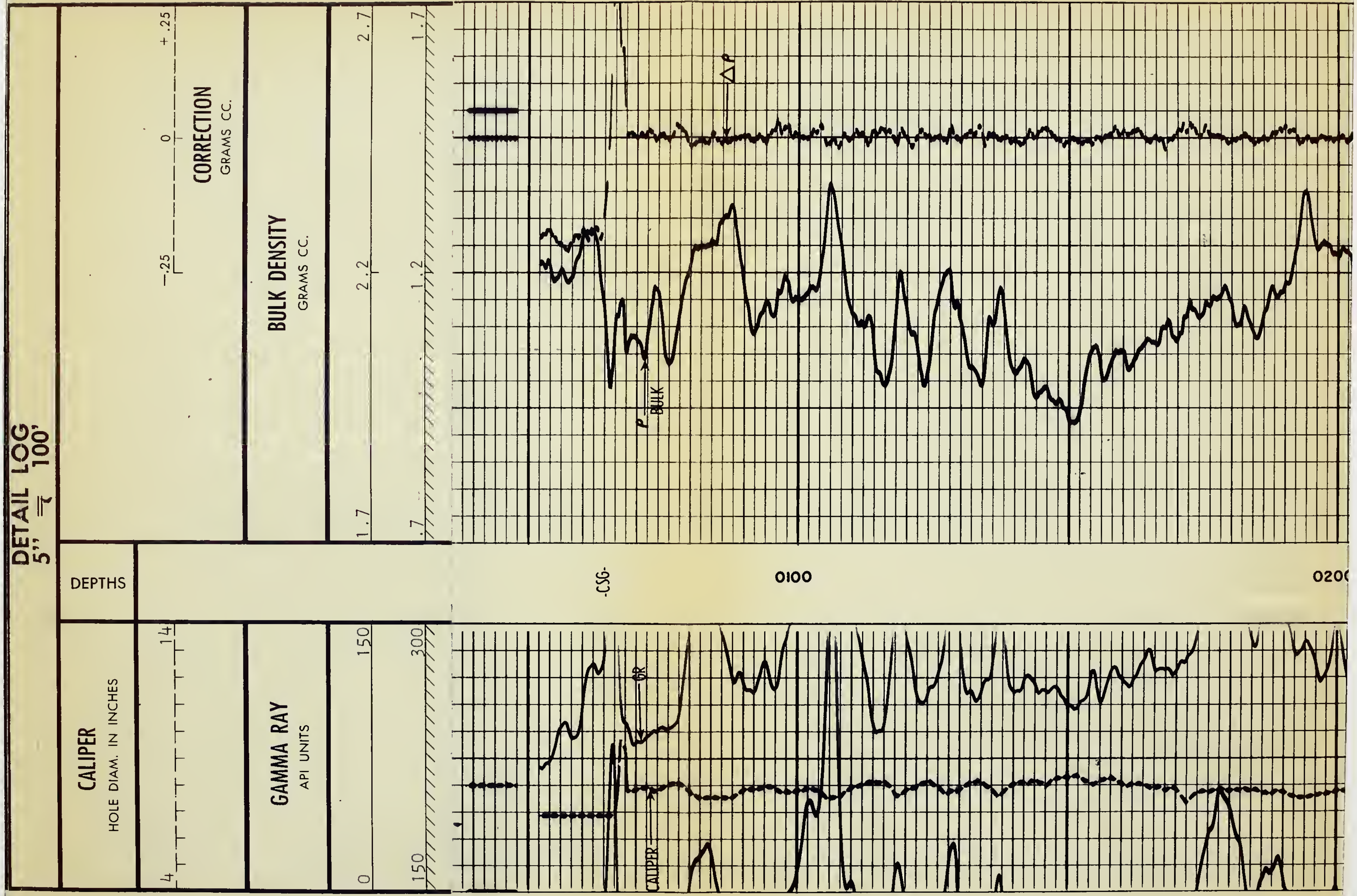
CALIBRATION DATA							
Run No.	Gamma Ray			FDC — Before Log — ACPS		FDC — After Log — ACPS	
	API Scale	Background CPS	Total CPS	P_1	P_2	P_1	P_2
1	0-150	30	340	359	629	363	629
2							
3							
4							

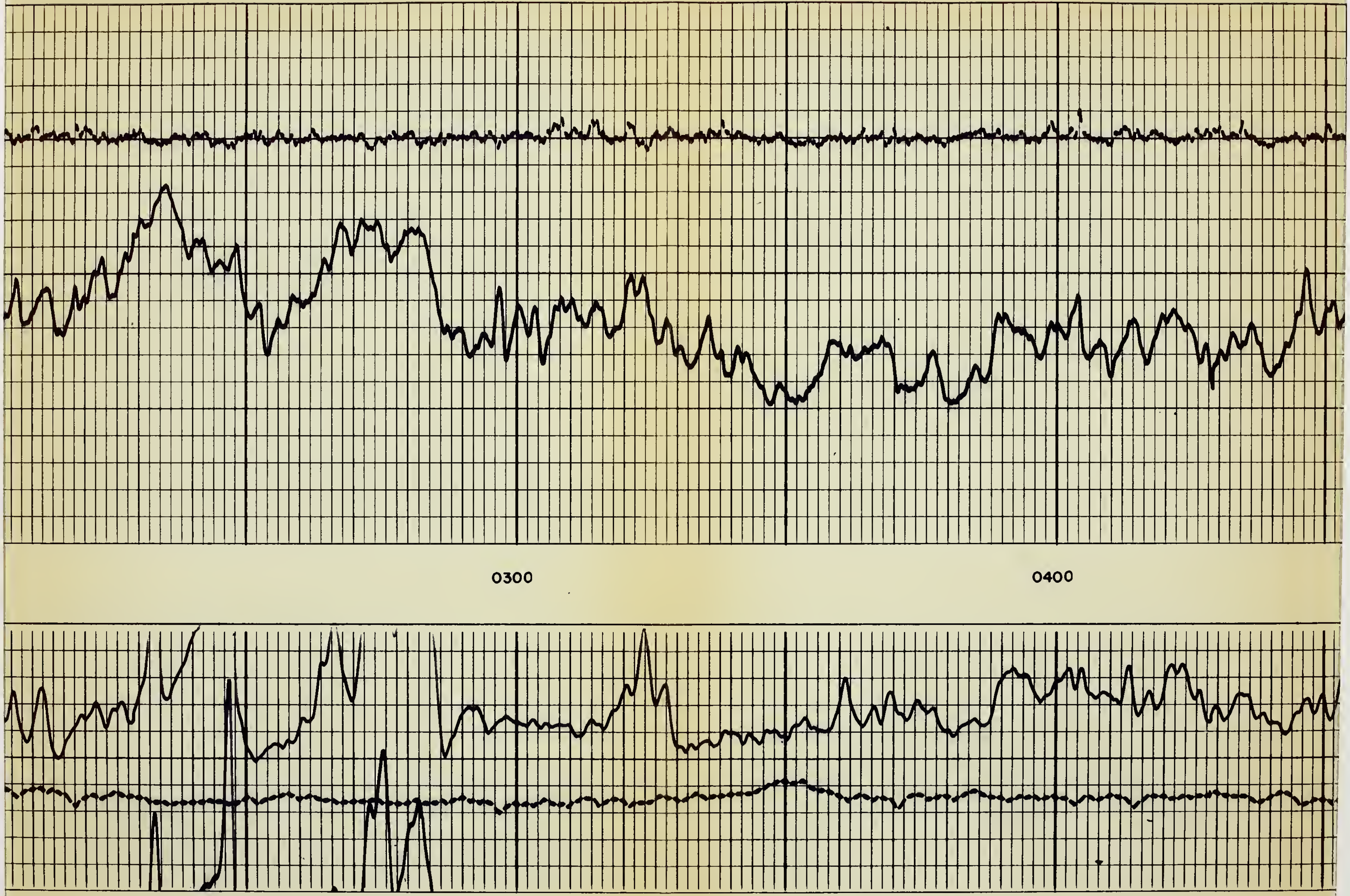
All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to Clause 7 of our General Terms and Conditions as set out in our current Price Schedule.




0400
0500
0600
0700
0800
0900


BULK DENSITY
GRAMS CC.
2.7
2.2
1.7
1.7
1.2
.7
CORRECTION
GRAMS CC.
-.25
0
+.25
Δρ
ρ BULK
DEPTHS
00
1100
1200
1300
1400
-TD- -FR-
GAMMA RAY
API UNITS
0
150
150
300
CALIPER
HOLE DIAM. IN INCHES
4
14
CALIPER
GR
FR-GR
1382 C


DETAIL LOG
5" = 100'
CORRECTION
GRAMS CC.
−.25
0
+.25
BULK DENSITY
GRAMS CC.
1.7
2.2
2.7
.7
1.2
1.7
ΔP
P BULK
DEPTHS
-CSG-
0100
0200
CALIPER
HOLE DIAM. IN INCHES
4
14
GAMMA RAY
API UNITS
0
150
150
300
GR
CALIPER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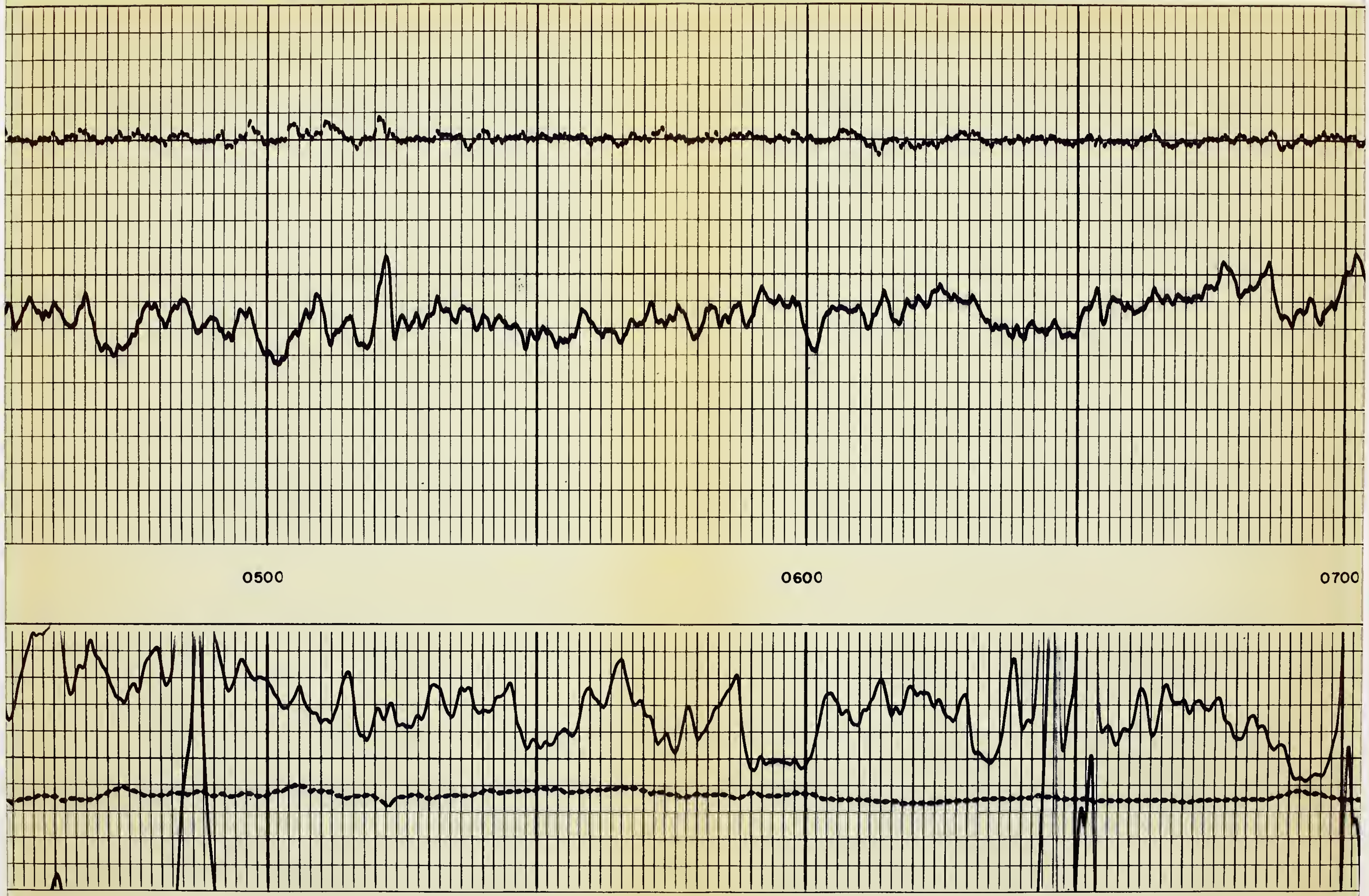
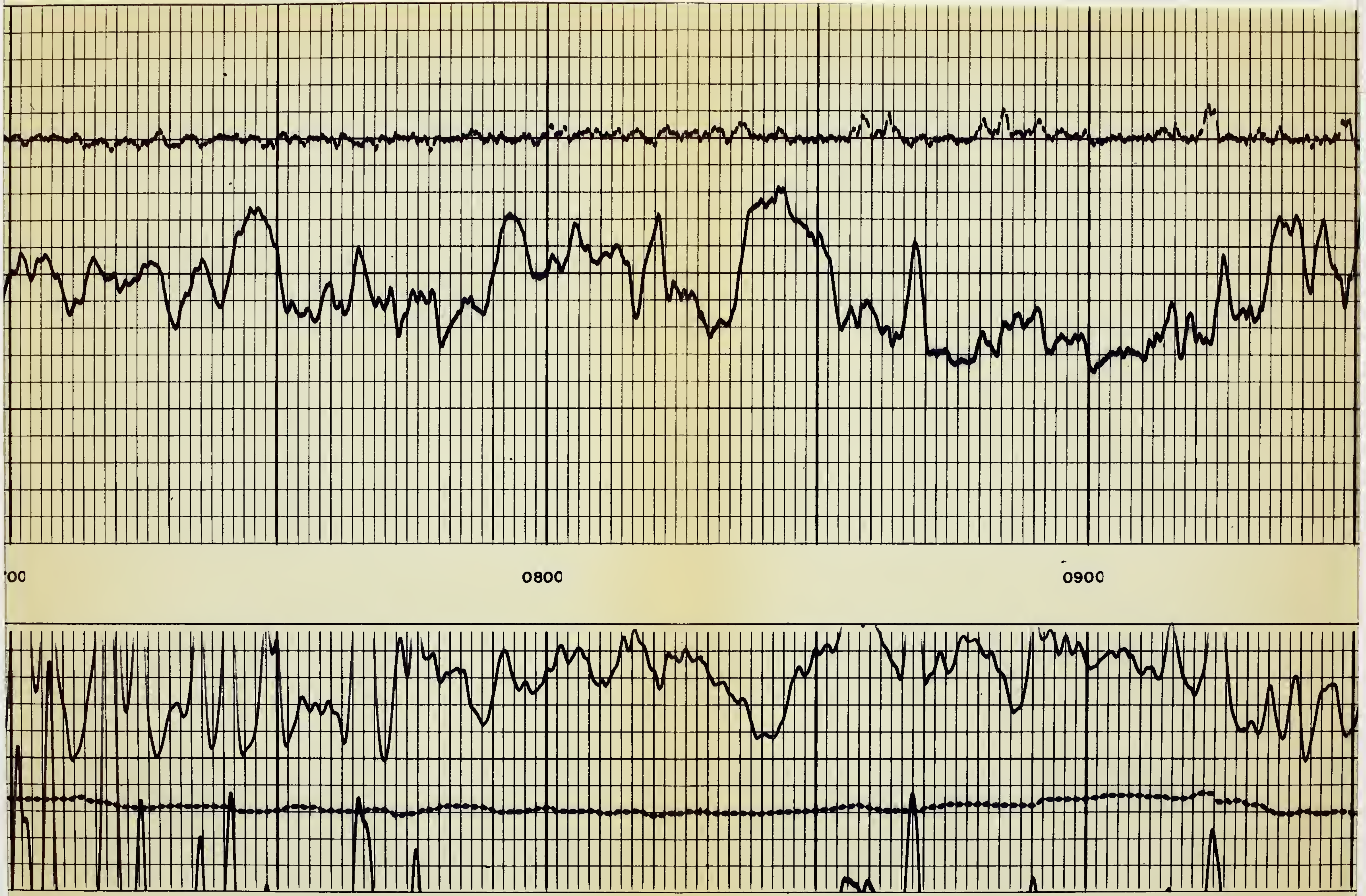
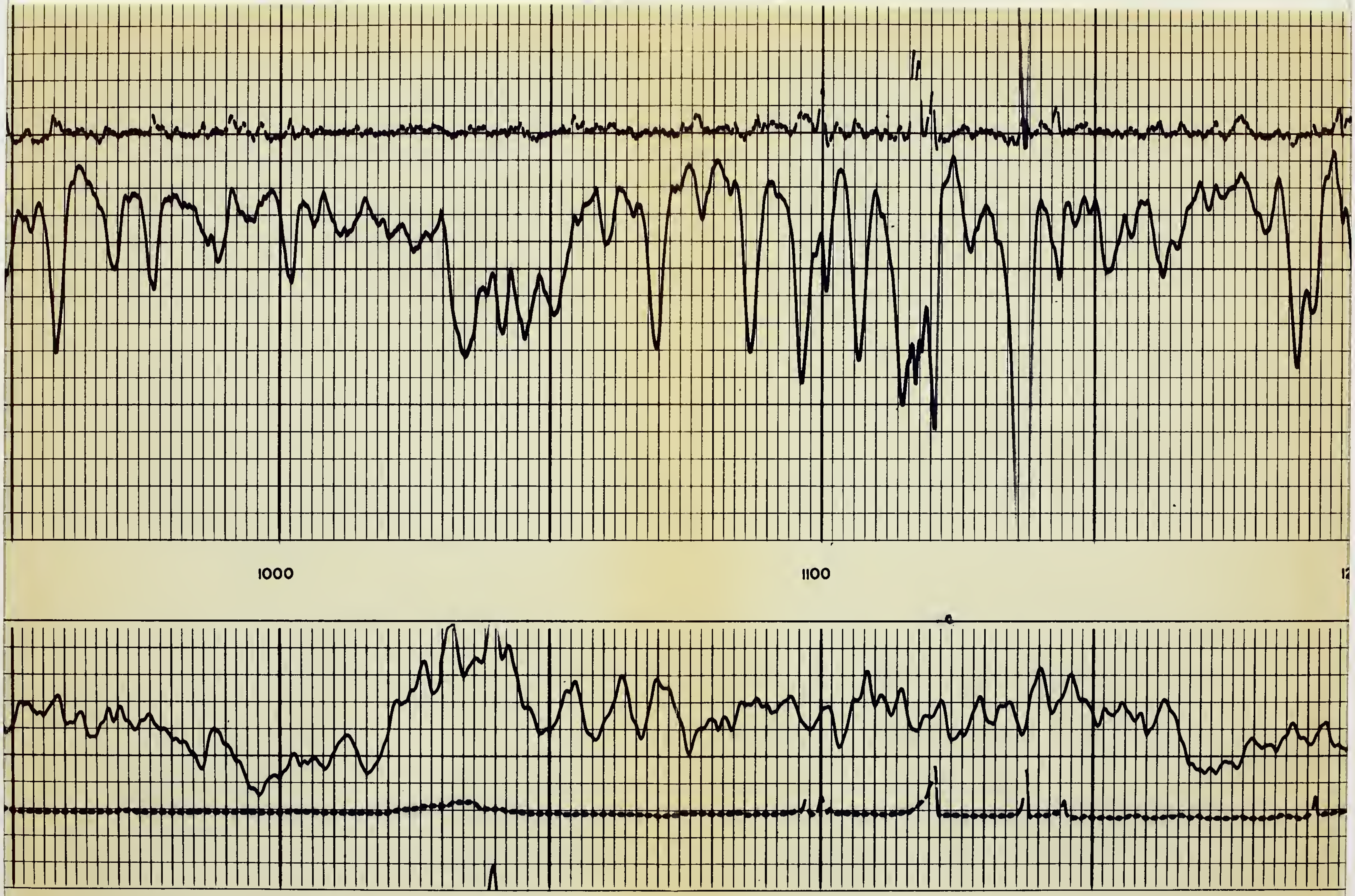
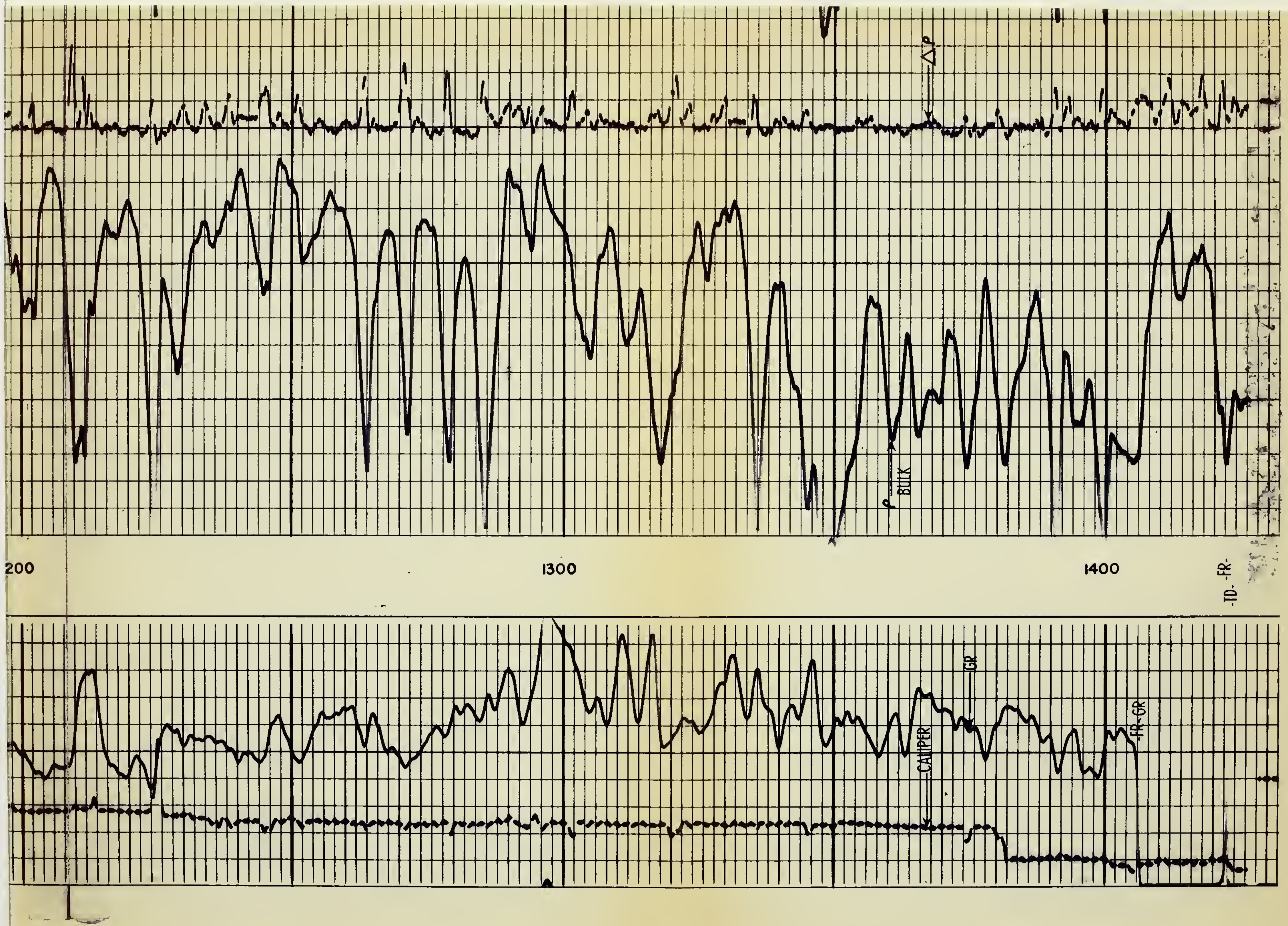
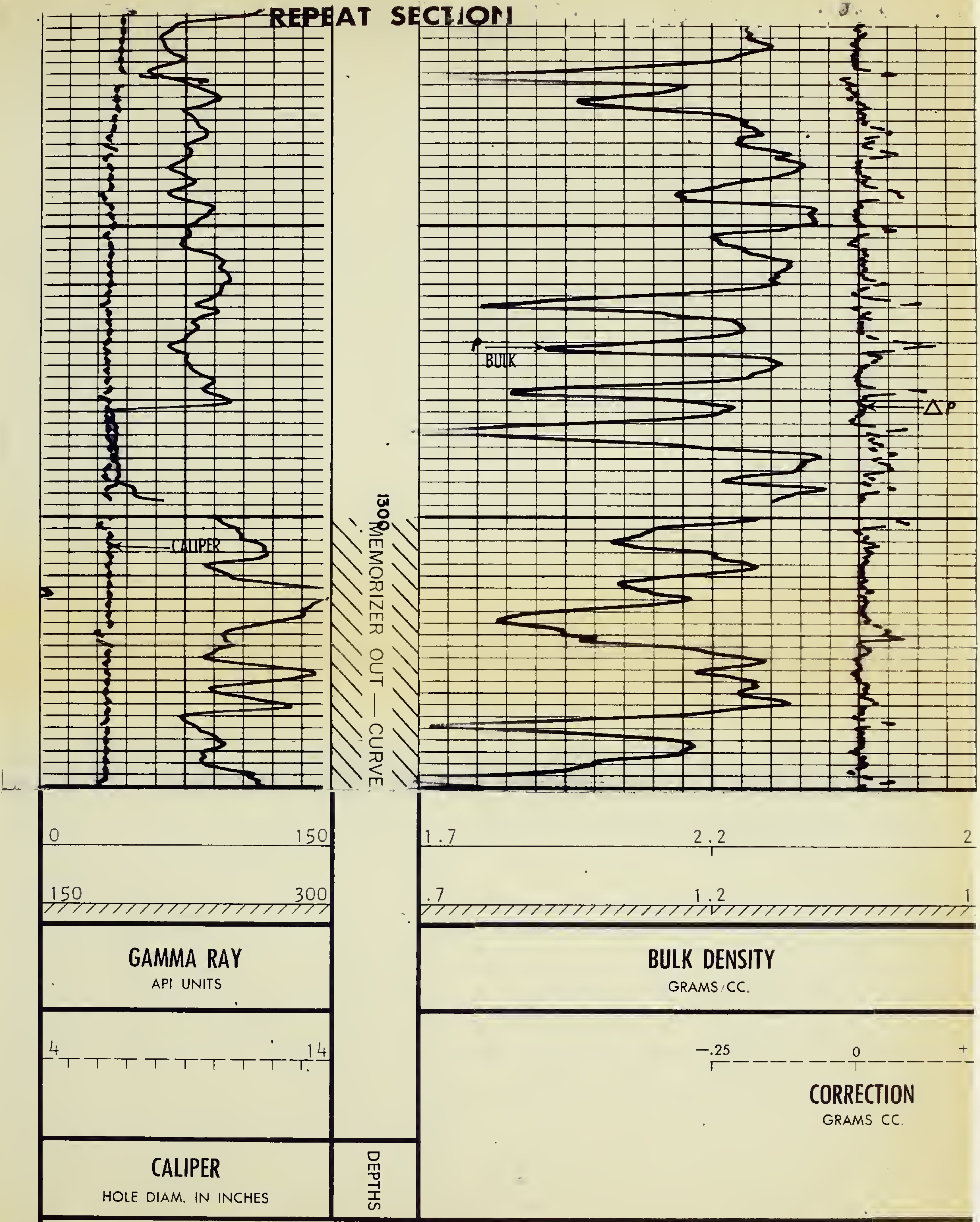

0500
0600
0700


'00
0800
0900


1000
1100


ΔP
ρ BULK
200
1300
1400
-TD- -FR-
CALIPER
GR
-FR-GR



COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM [illegible]

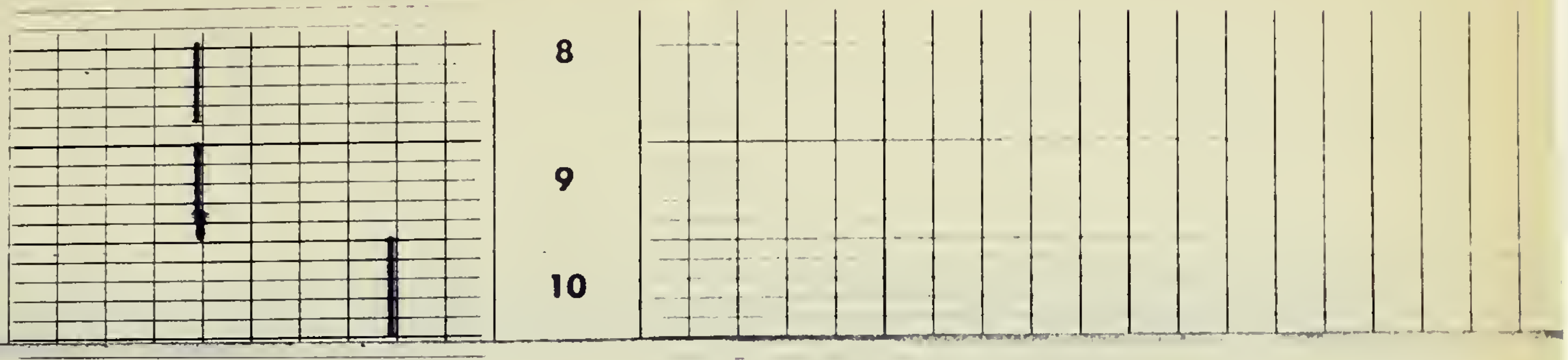
FIELD SORGHUM [illegible]

COUNTY RIO BLANCO STATE COLORADO

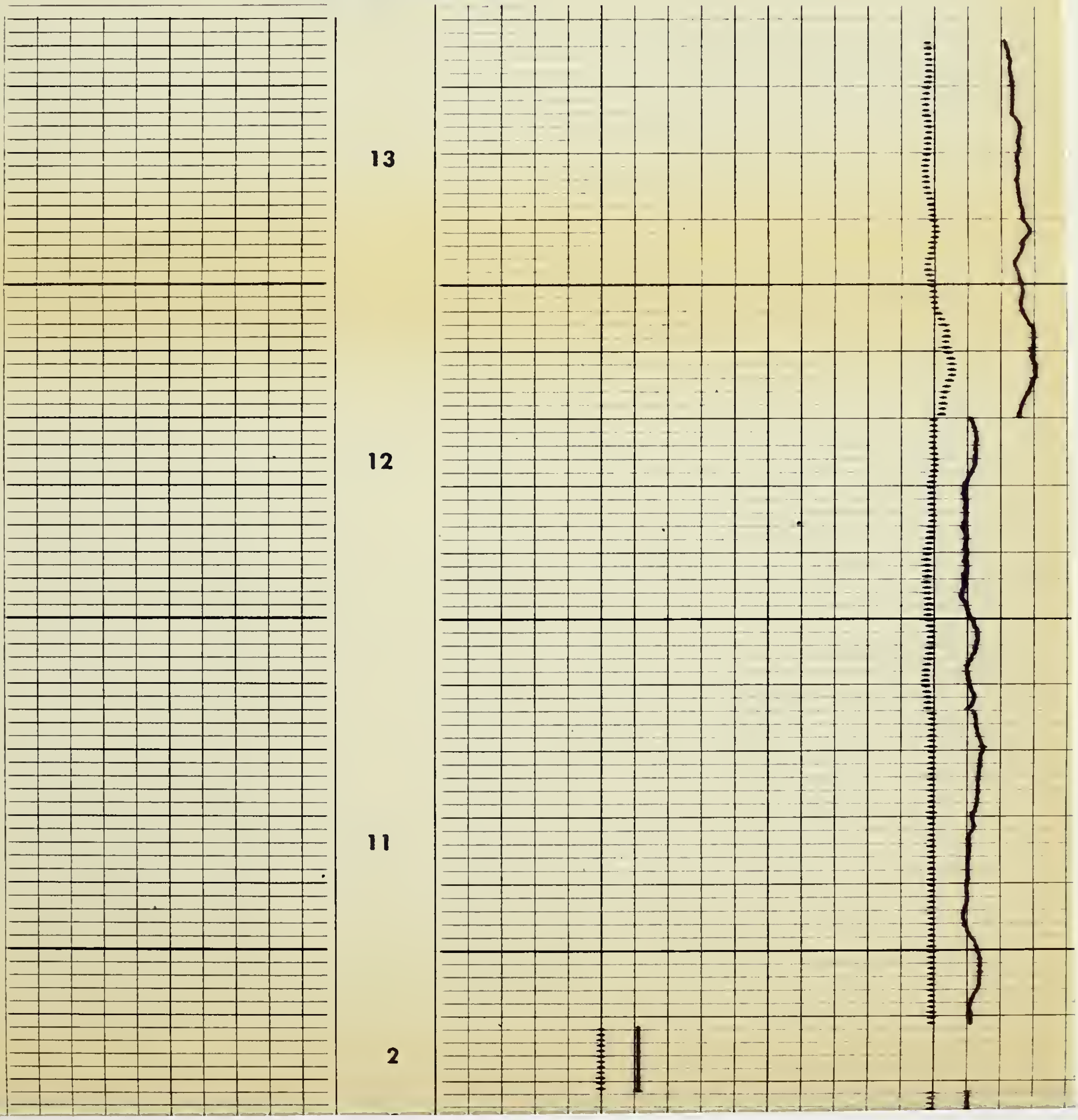
SCHL. FR 1422
SCHL. TD 1423
DRLR TD 1430

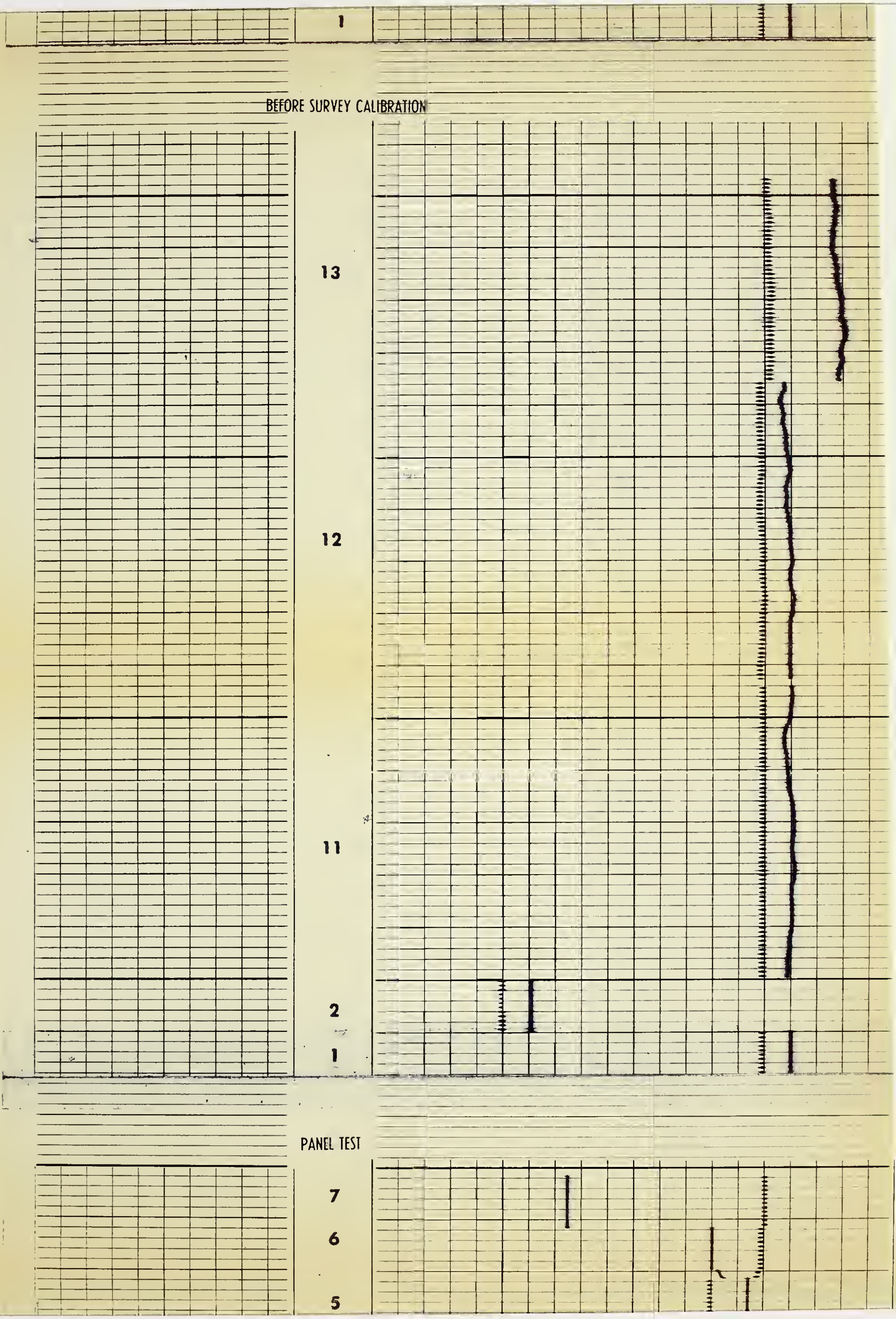
CALIBRATION RECORD

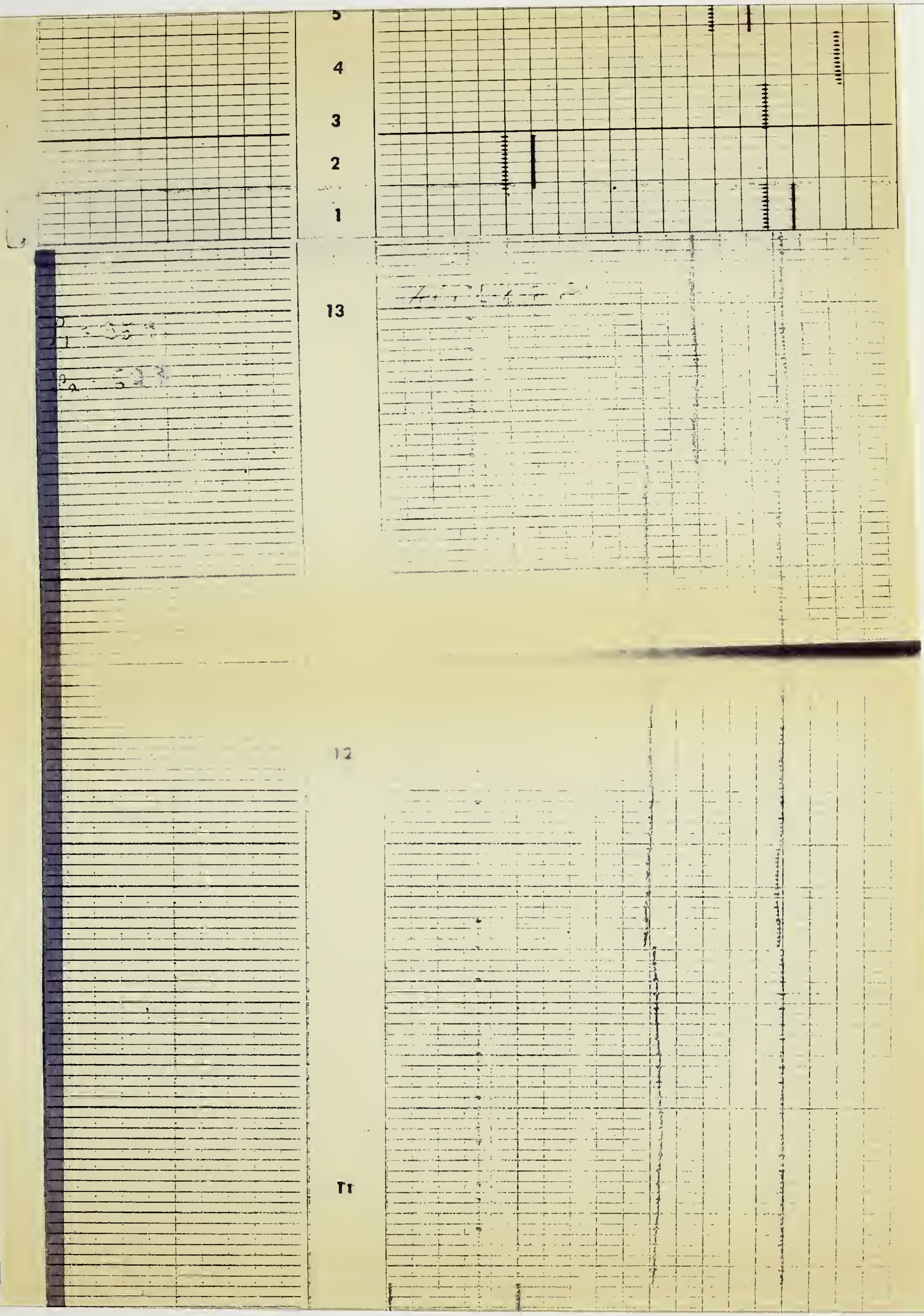
CALIPER CALIBRATION

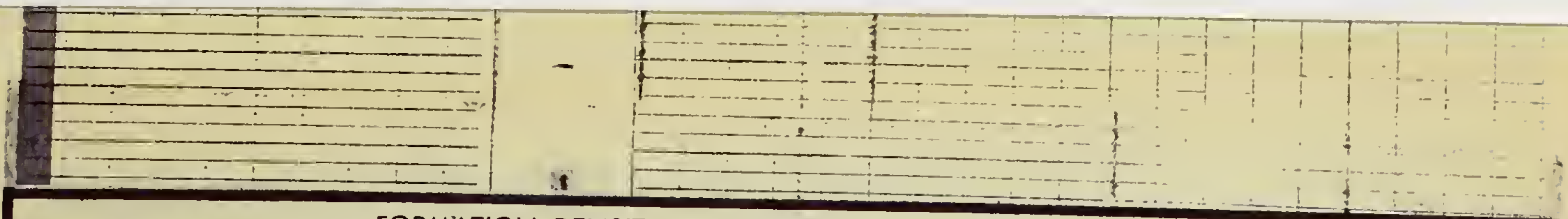


AFTER SURVEY CALIBRATION




1
BEFORE SURVEY CALIBRATION
13
12
11
2
1
PANEL TEST
7
6
5


5
4
3
2
1
13
12
11



FORMATION DENSITY COMPENSATED CALIBRATION CODING

1. MECHANICAL ZERO
2. RECORDER SENSITIVITY

PANEL TEST

	POS	FDC LIQUID ρ	$\Delta\rho$
3.	# 1	2.92	.00
4.	# 2	2.78	+.14
6.	# 3	2.42	−.10
6.	# 4	2.35	.00
7.	# 5	2.08	.01

8. MECHANICAL ZERO CALIPER
9. 8″ RING
10. 12″ RING
11. TOOL CALIBRATE #1 SET $\rho = 2.50$
12. TOOL CALIBRATE #2 SET $\Delta\rho = .00$
13. LOG POSITION $\rho = 2.59$, $\Delta\rho = .015$

↑

CALIBRATION RECORD

COMPANY ATLANTIC RICHFIELD COMPANY
WELL SORGHUM GULCH #18
FIELD SORGHUM GULCH
COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 1422
SCHL. TD 1423
DRLR TD 1430
Elev:
KB ----
DF ----
GL 7383

Schlumberger

TEMPERATURE LOG

COUNTY RIO BLANCO
FIELD or LOCATION SORGHUM GULCH
WELL SORGHUM GULCH #18
COMPANY ATLANTIC RICHFIELD

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #18

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

LOCATION
1240' FSL & 366' FEL

Sec. 25 Twp. 3S Rge. 97W

Other Services:
BHC-GR
LL-7
FDC-GR

Permanent Datum: GL ; Elev.: 7383
Log Measured From GL , Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B. ----
D.F. ---
G.L. 7383

Date	10-4-74		
Run No.	ONE		
Depth—Driller	1430		
Depth—Logger	1426		
Btm. Log Interval	1422		
Top Log Interval	50		
Casing—Driller	7 @ 60	@	@
Casing—Logger	-		
Casing Size 1	7 To 60	To	- To
2	- To	To	To
Casing Weight 1	-		
2	-		
Casing Thickness 1	-		
2	-		
Bit Size 1	6 1/4 To 1430	To	To
2	- To -	To	To
Type Fluid in Hole	WATER		
Dens. | Visc.	| -	|	|
Time Since Circ.			
BHT	81.5° F		
Equip. | Location	7674 | VERNAL	|	|
Recorded By	HAUGAARD		
Witnessed By	TAIT		

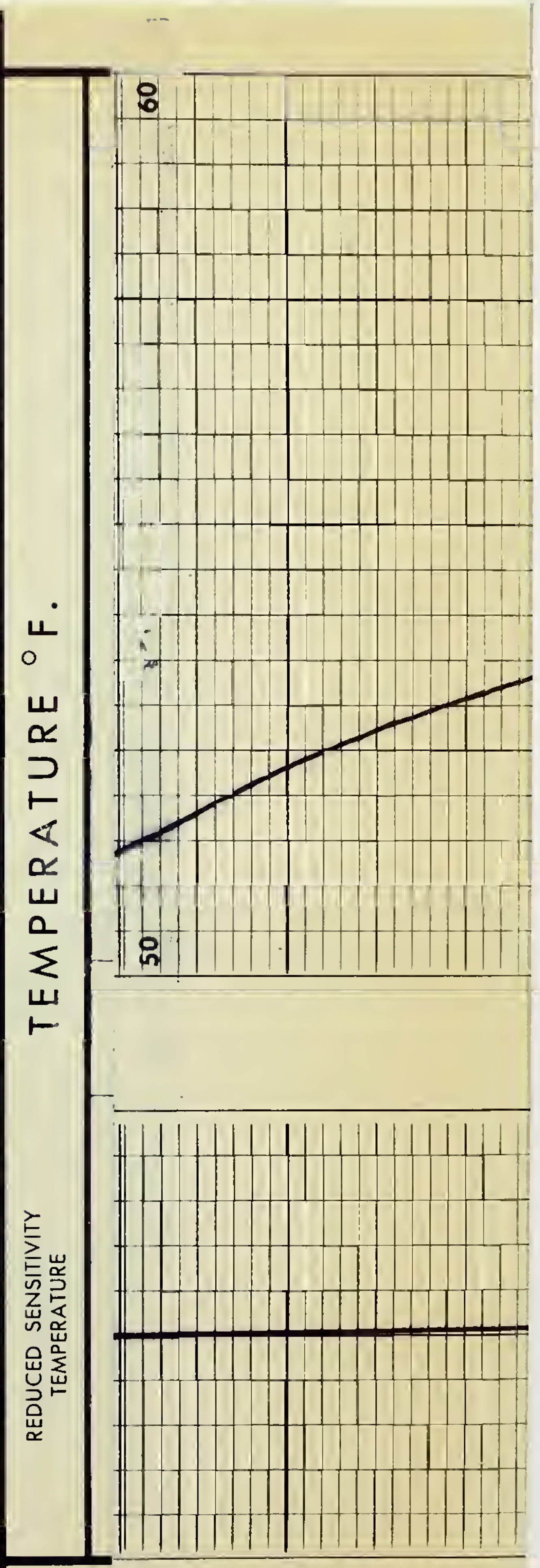
The well name, location and borehole reference data were furnished by the customer.

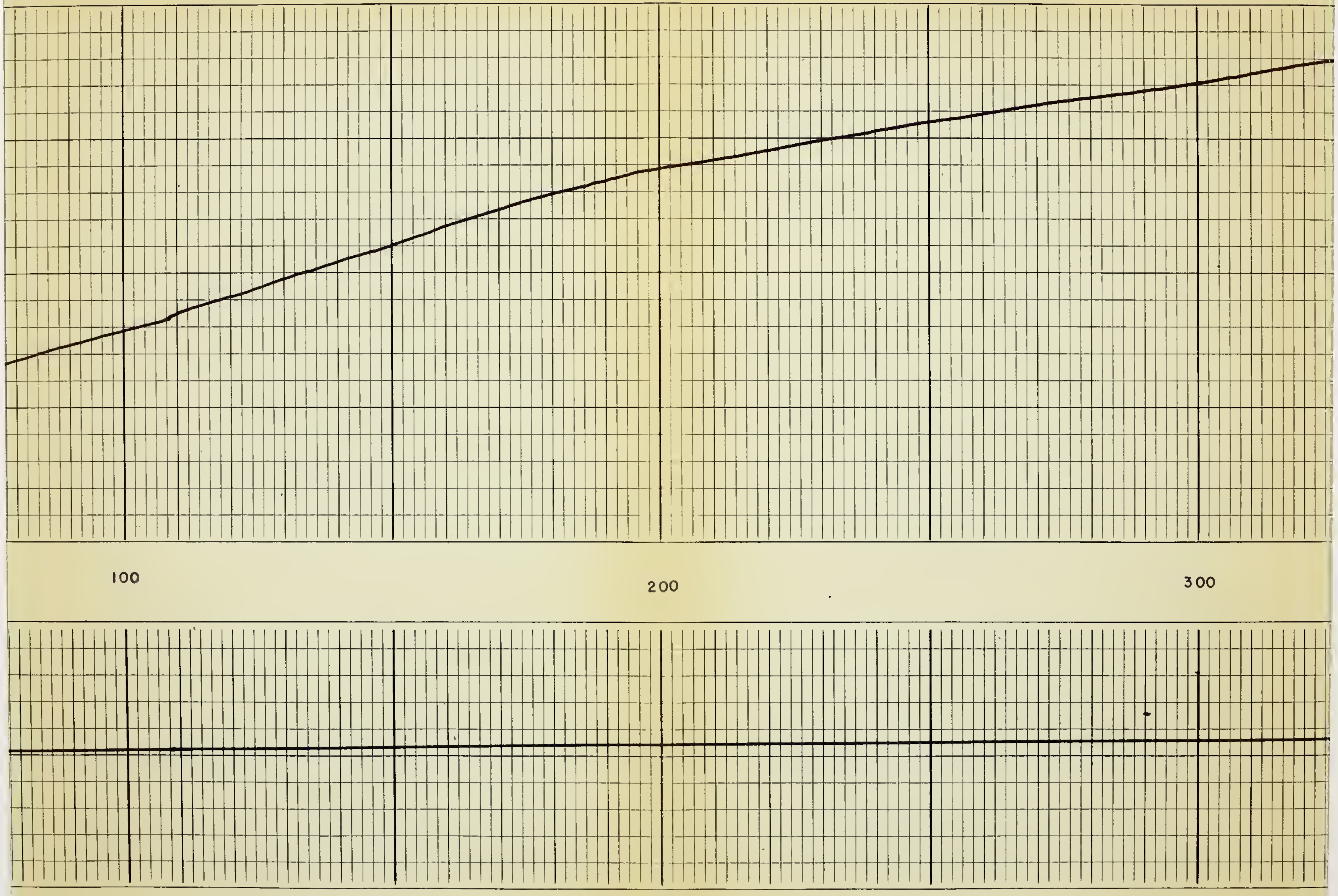
FOLD HERE

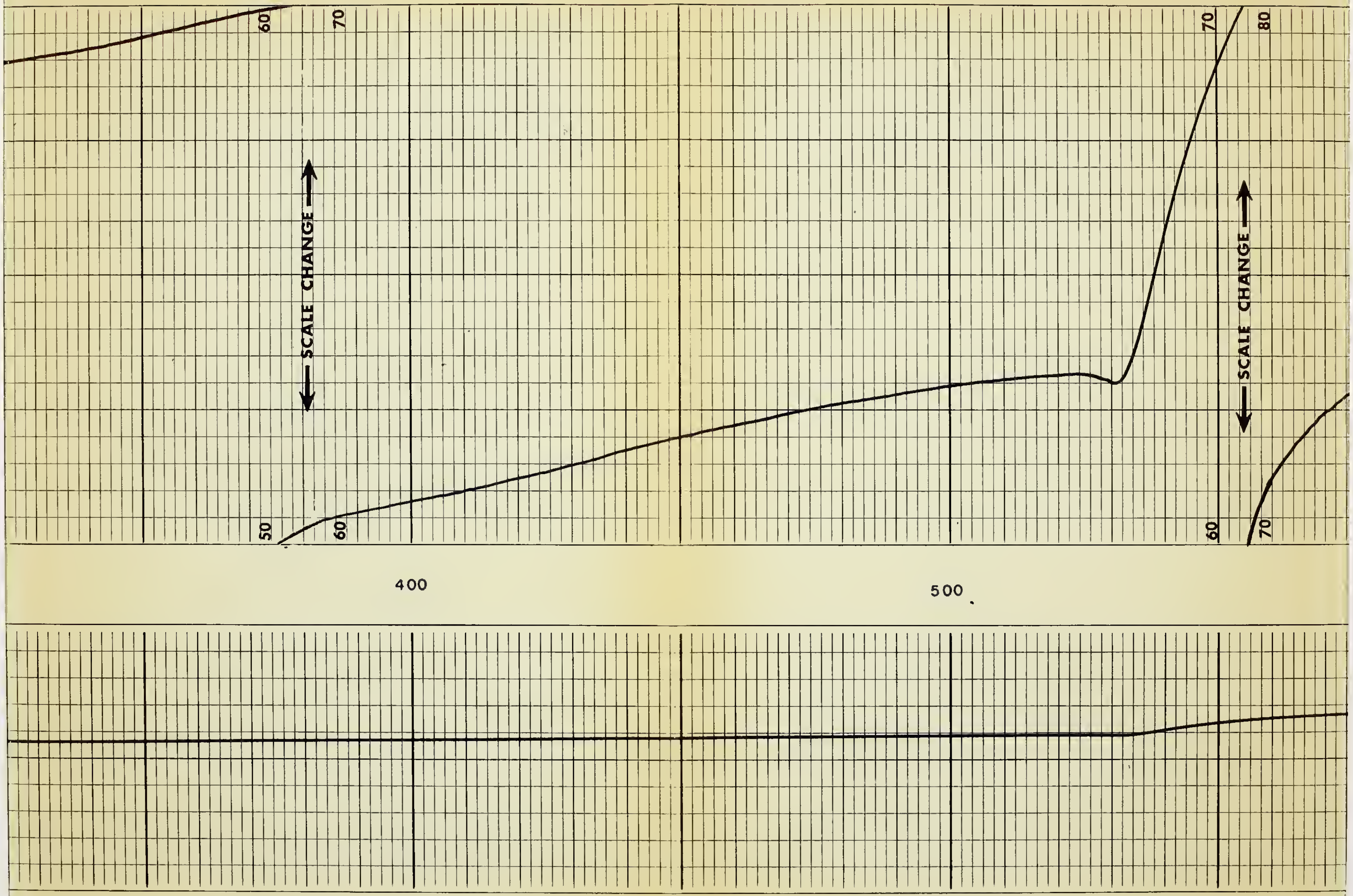
REMARKS:

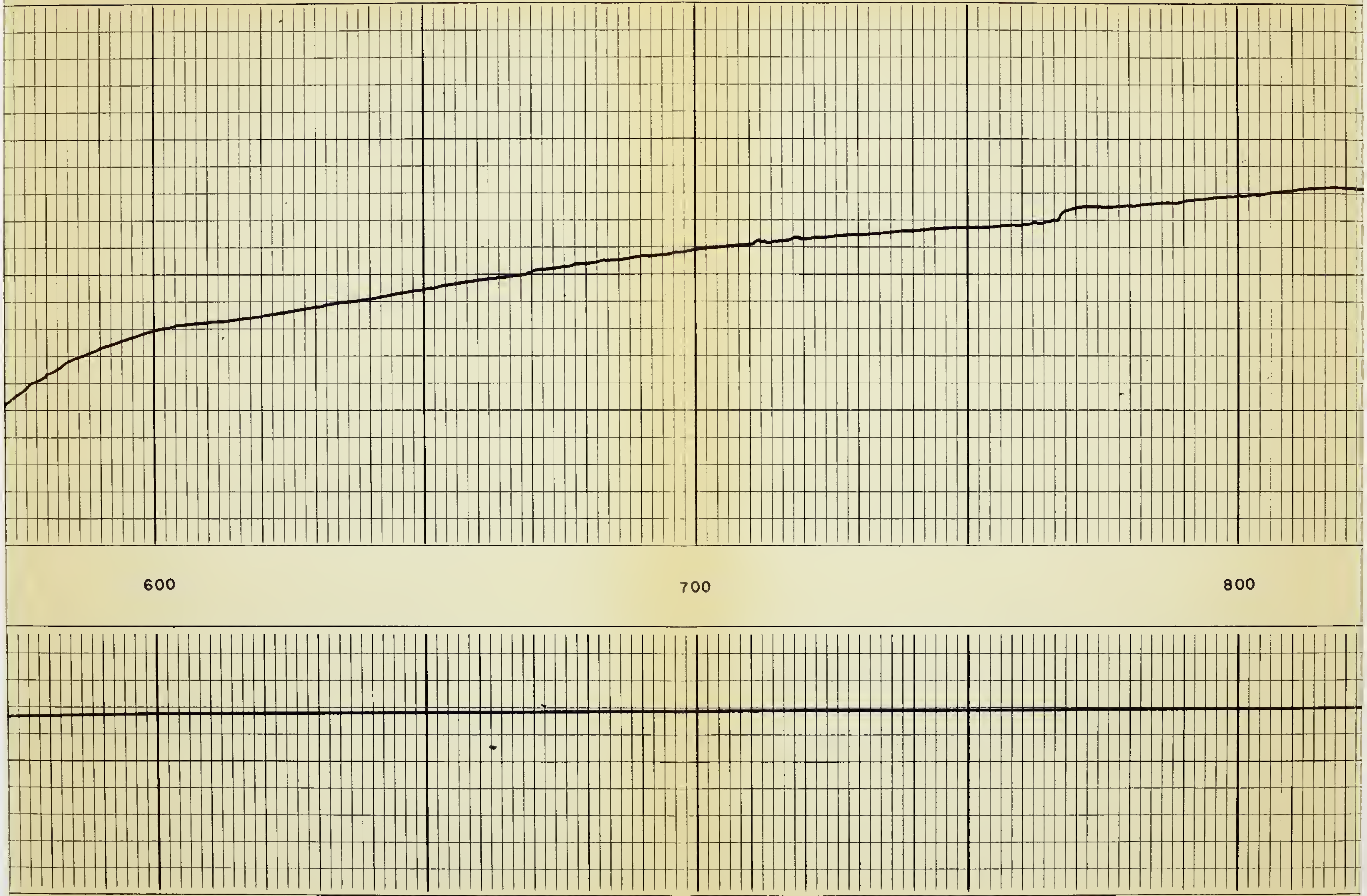
CEMENTATION DATA

Date	Depth	Type of Cement	No. of Sacks	Additives	Calculated Top




100
200
300


60
70
70
80
SCALE CHANGE
SCALE CHANGE
50
60
60
70
400
500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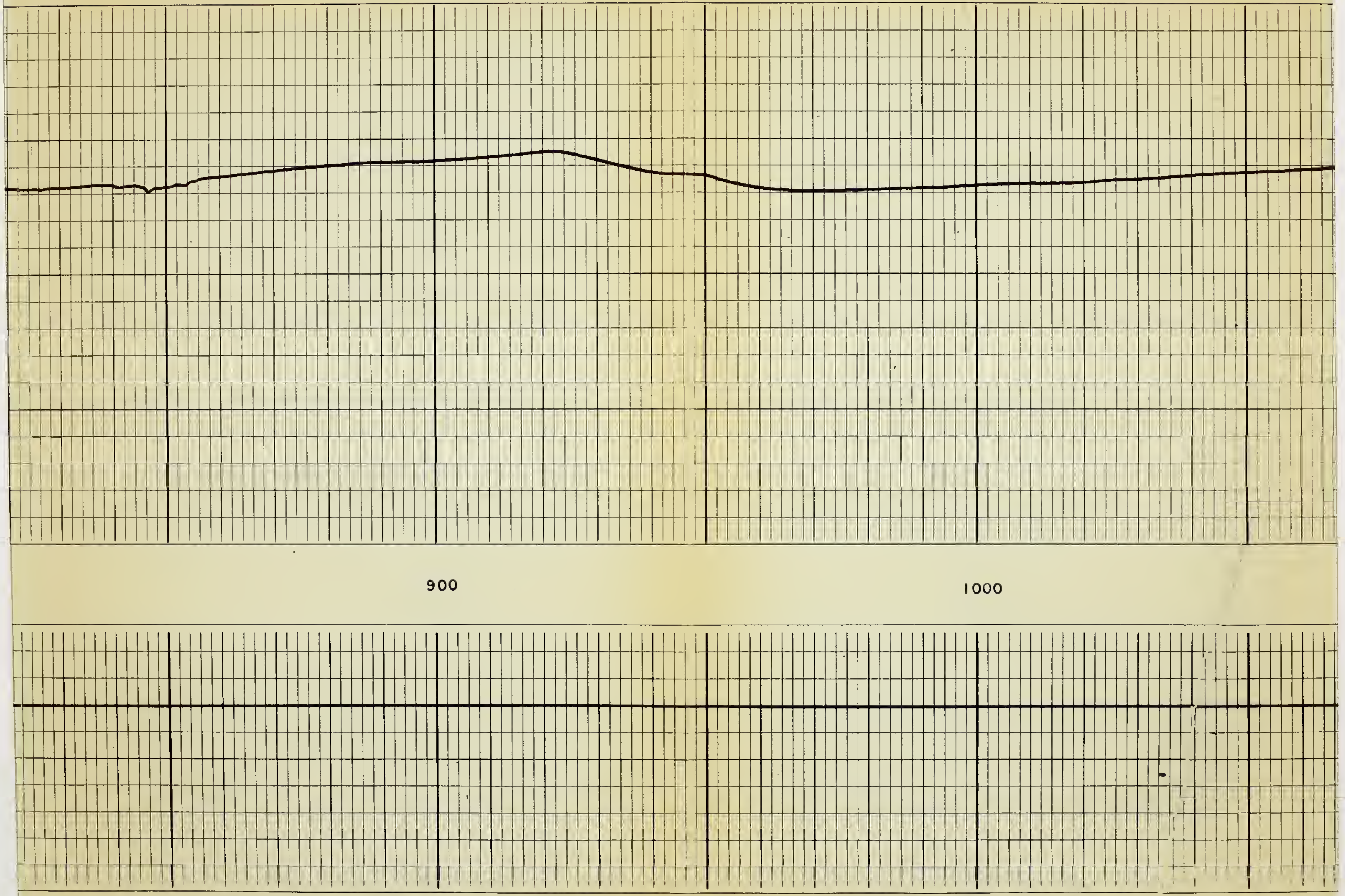
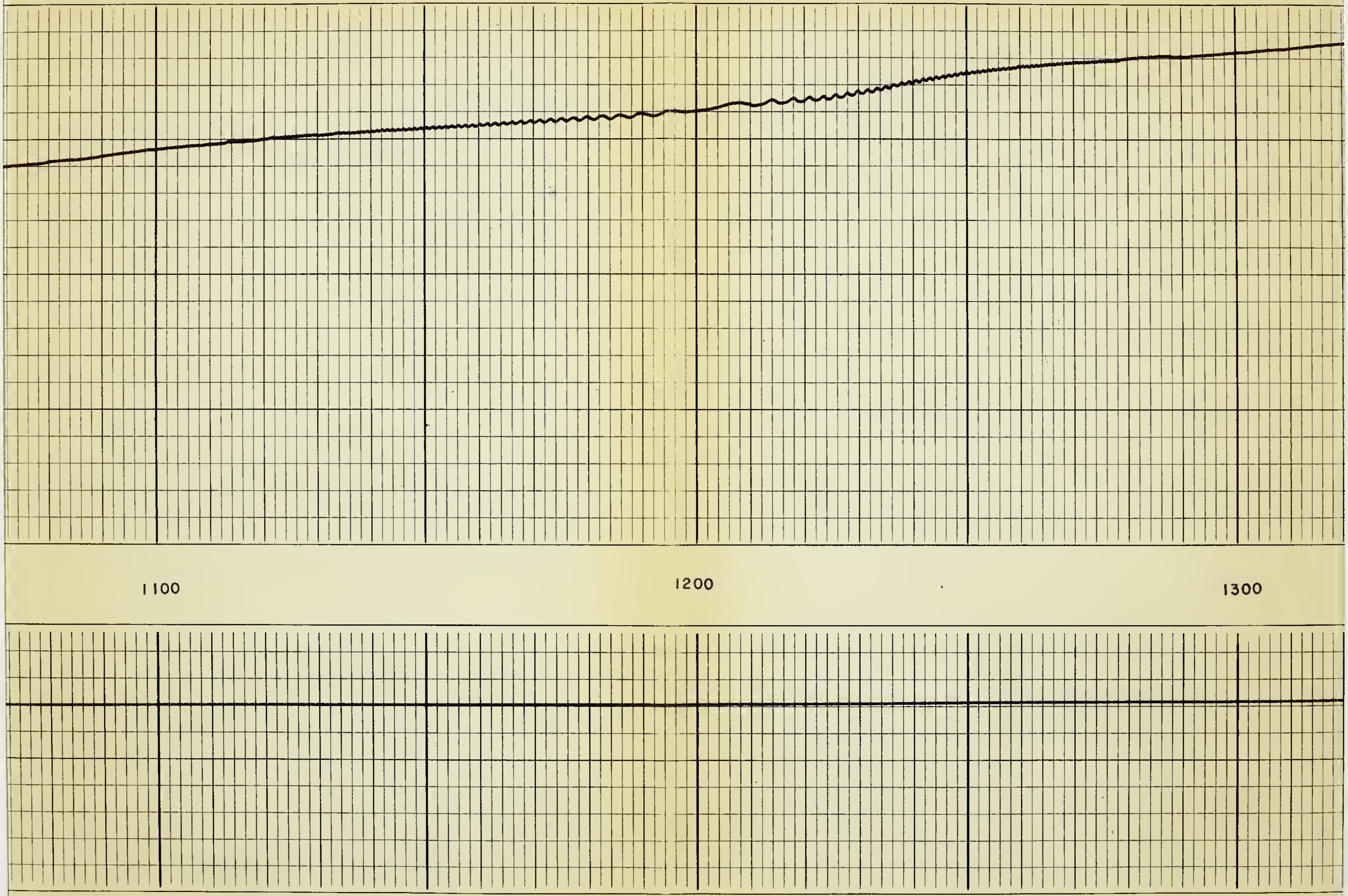
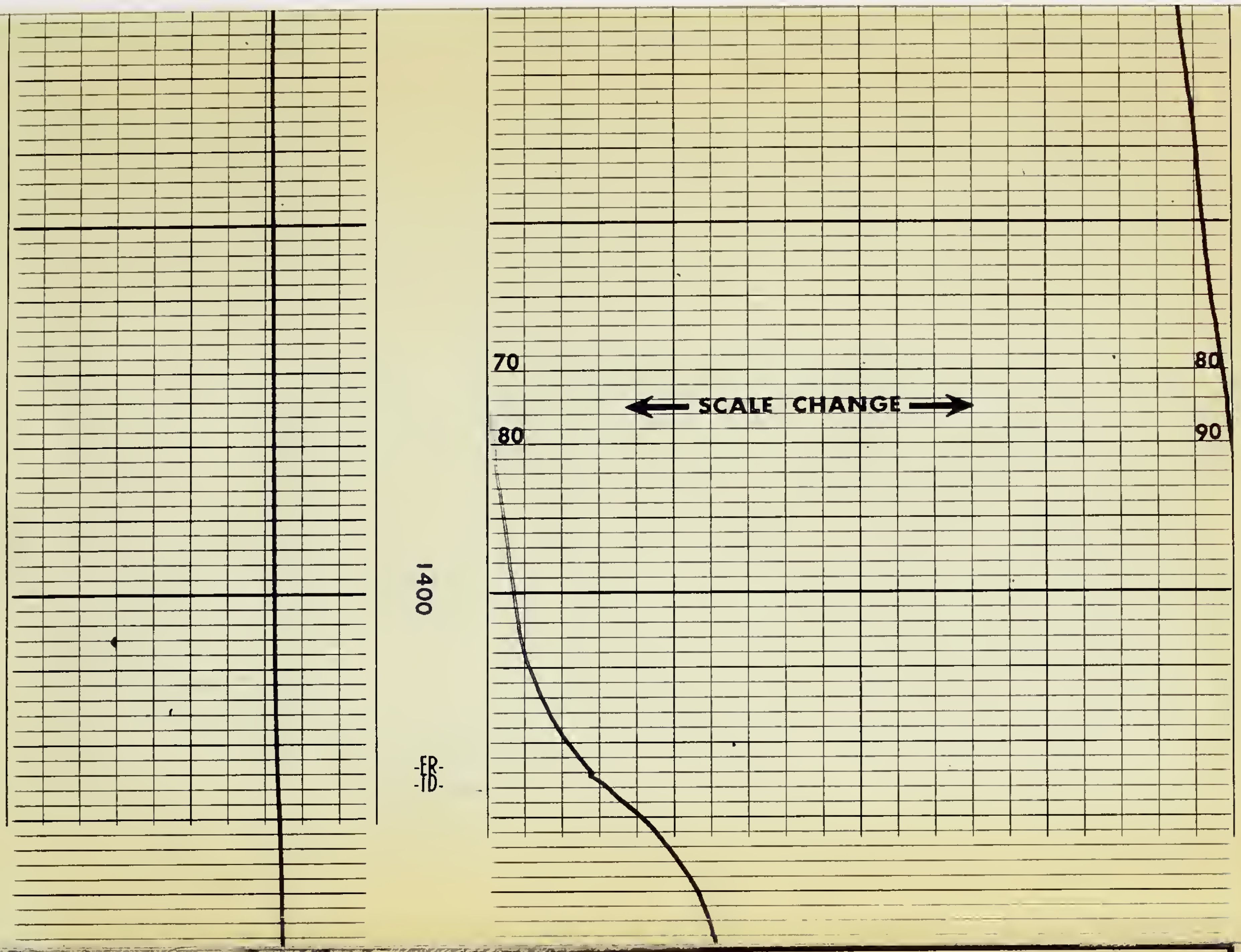
700
800


900
1000


1100
1200
1300



TEMPERATURE °F.

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #18

FIELD SORGHUM GULCH

COUNTY RIO BLANCO

STATE COLORADO

SCHL. F. R. 1422

SCHL. T. D. 1426

DRLR. T. D. 1430

COREHOLE SG-19

THIS ENVELOPE CONTAINS THE FOLLOWING GEOPHYSICAL LOGS:

Schlumberger: Borehole Compensated Sonic
Laterolog
Formation Density
Temperature

II B-369

Schlumberger

BOREHOLE COMPENSATED SONIC LOG

COUNTY RIO BLANCO
FIELD or LOCATION SORGHUM GULCH
WELL SORGHUM GULCH -19
COMPANY ATLANTIC RICHFIELD

COMPANY ATLANTIC RICHFIELD COMPAN.

WELL SORGHUM GULCH 19

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

LOCATION: API Serial No.
NW NW NW
Sec. 5 Twp. 3S Rge. 96W

Other Services:
LL7
FDC GR
TEMP

Permanent Datum: G.L. ; Elev.: 6370
Log Measured From G.L. , 0 Ft. Above Perm. Datum
Drilling Measured From G.L.

Elev.: K.B.
D.F. --
G.L. 6370

Date	9/24/74			
Run No.	ONE			
Depth—Driller	920			
Depth—Logger	936			
Btm. Log Interval	923			
Top Log Interval	350			
Casing—Driller	7' @ 150	@	@	@
Casing—Logger				
Bit Size	6 1/4			
Type Fluid in Hole	WATER			
Dens. | Visc.	| ----	|	|	|
pH | Fluid Loss	| -- ml	| ml	| ml	| ml
Source of Sample				
R_m @ Meas. Temp.	---- @ -- °F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	-- @ --- °F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	-- @ -- °F	@ °F	@ °F	@ °F
Source: R_{mf} | R_{mc}	|	|	|	|
R_m @ BHT	@ -- °F	@ °F	@ °F	@
TIME Circulation Stopped	--			
Max. Rec. Temp.	61.5 °F	°F	°F	°F
Equip. | Location	7033 | VERN	|	|	|
Recorded By	HAUGAARD			
Witnessed By	LLARD, TAIT			

SWS-1384-G

FOLD HERE

The well name, location and borehole reference data were furnished by the customer.

Run No.	ONE			
Service Order No.	7033			
Fluid Level	FULL			

SCALE CHANGES

Type Log	Depth	Scale Up Hole	Scale Down Hole

EQUIPMENT DATA

Sonic Panel No.	JG 110			
Sonic Cart No.	DG-130			
Sonic Sonde No.	KS-163			
Mem. Panel No.	ILLA 166			
G.R. Cart. No.	J 204			
G.R. Panel No.	ILLA-166			
Caliper No.				
TTR No.				
Centralizers: No.				
Type				
Standoffs: No.	2			
Type	RUBBER			
Time Const.-Sec.	2			
Speed - F.P.M.	30			

LOGGING DATA

Δt_m	Δt_f	Cp	Porosity Selectors ϕ Scale	Depth From	Depth To

CALIBRATION DATA

GR	BKG. CPS	100			
	Source CPS	400			
	Tc Sec	6			

REMARKS

WELL WAS FLOWING WHILE LOGGING.
TURBULENCE PREVENTED A GOOD SONIC
ABOVE 400'. CUSTOMER DID NOT
WANT TO TAKE TIME TO MUD UP.

$$\text{Velocity (ft/sec)} = \frac{1{,}000{,}000}{\text{Interval Transit Time (microseconds per foot)}}$$

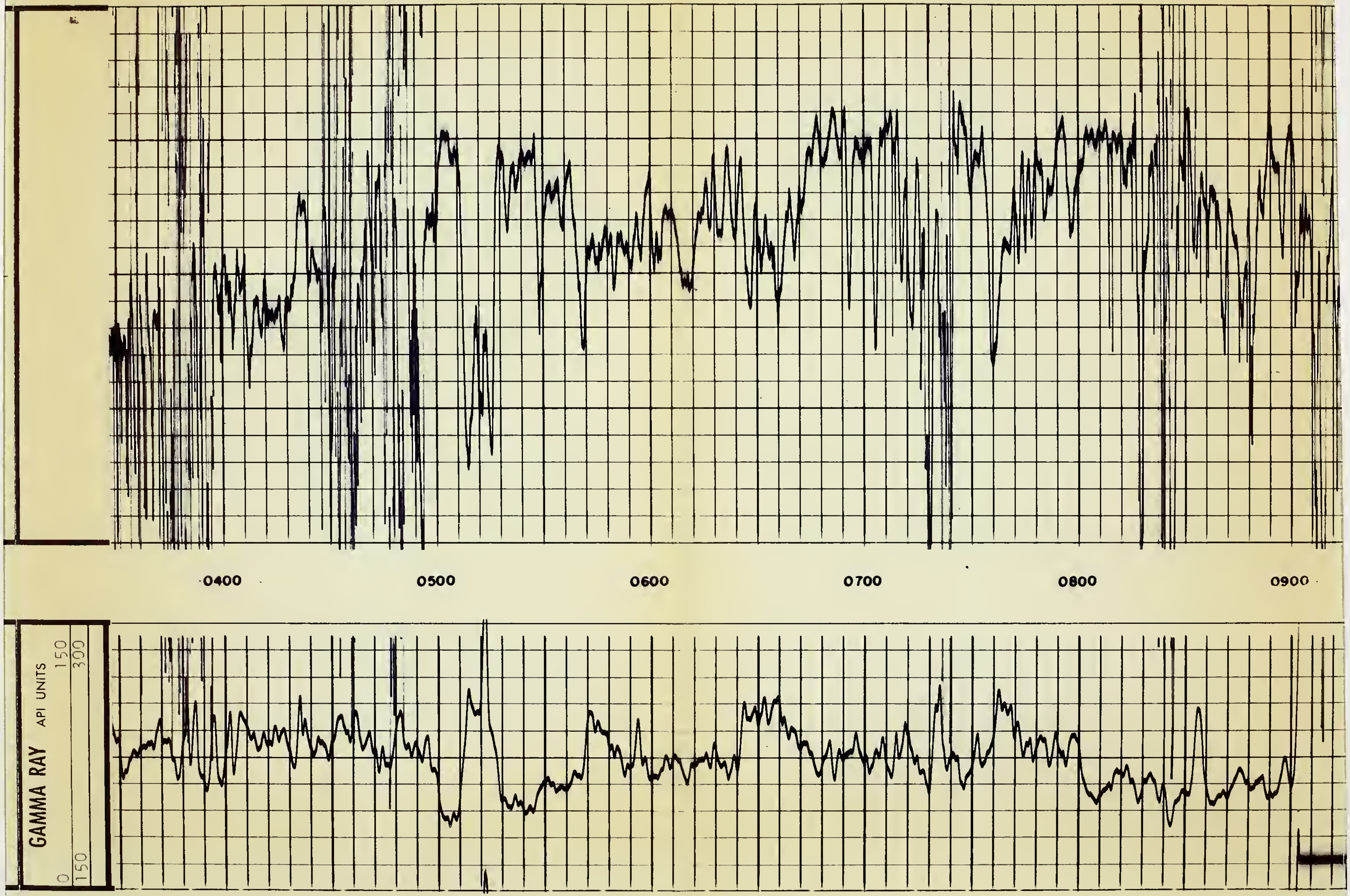
All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to Clause 7 of our General Terms and Conditions as set out in our current Price Schedule.

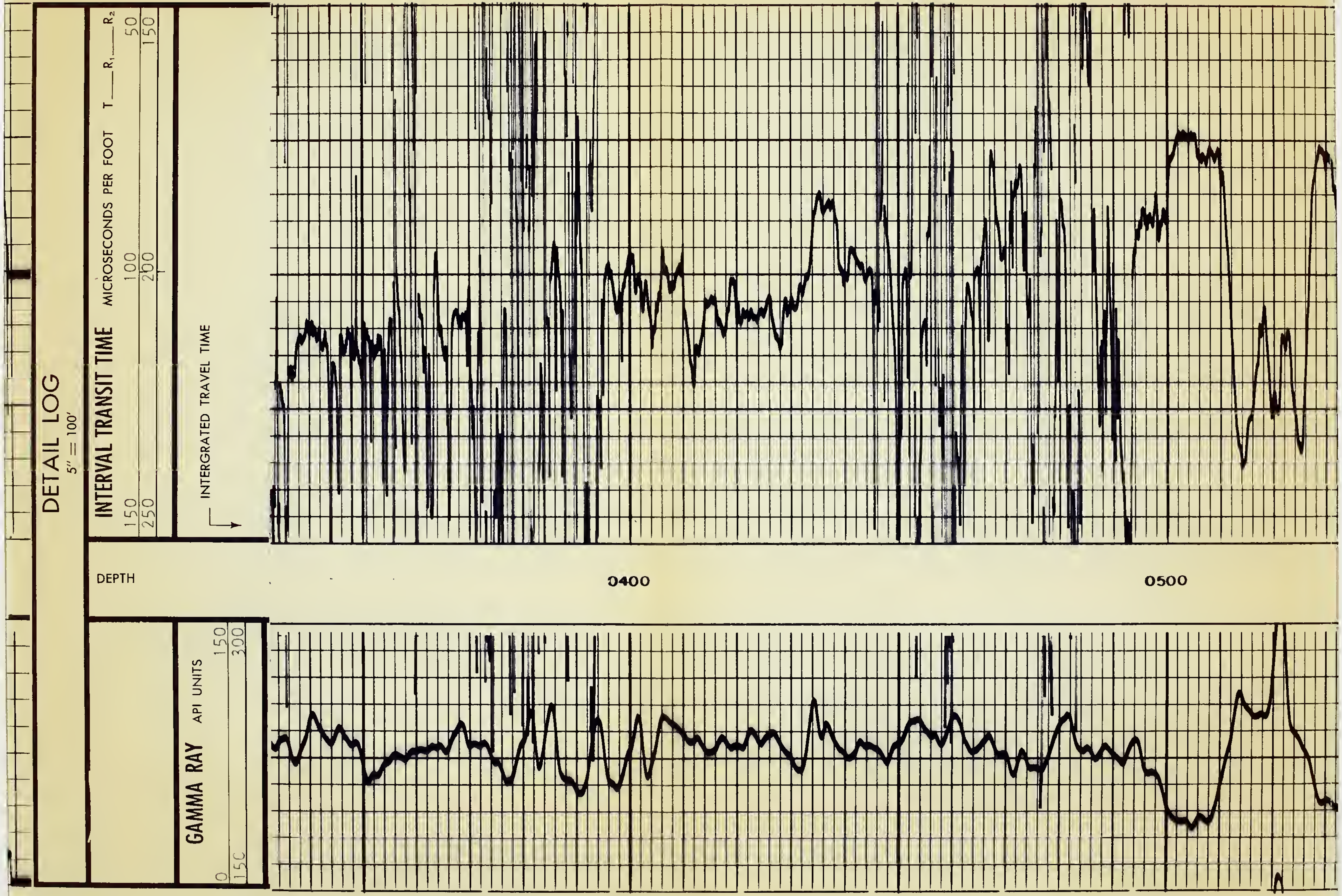
INTERVAL TRANSIT TIME

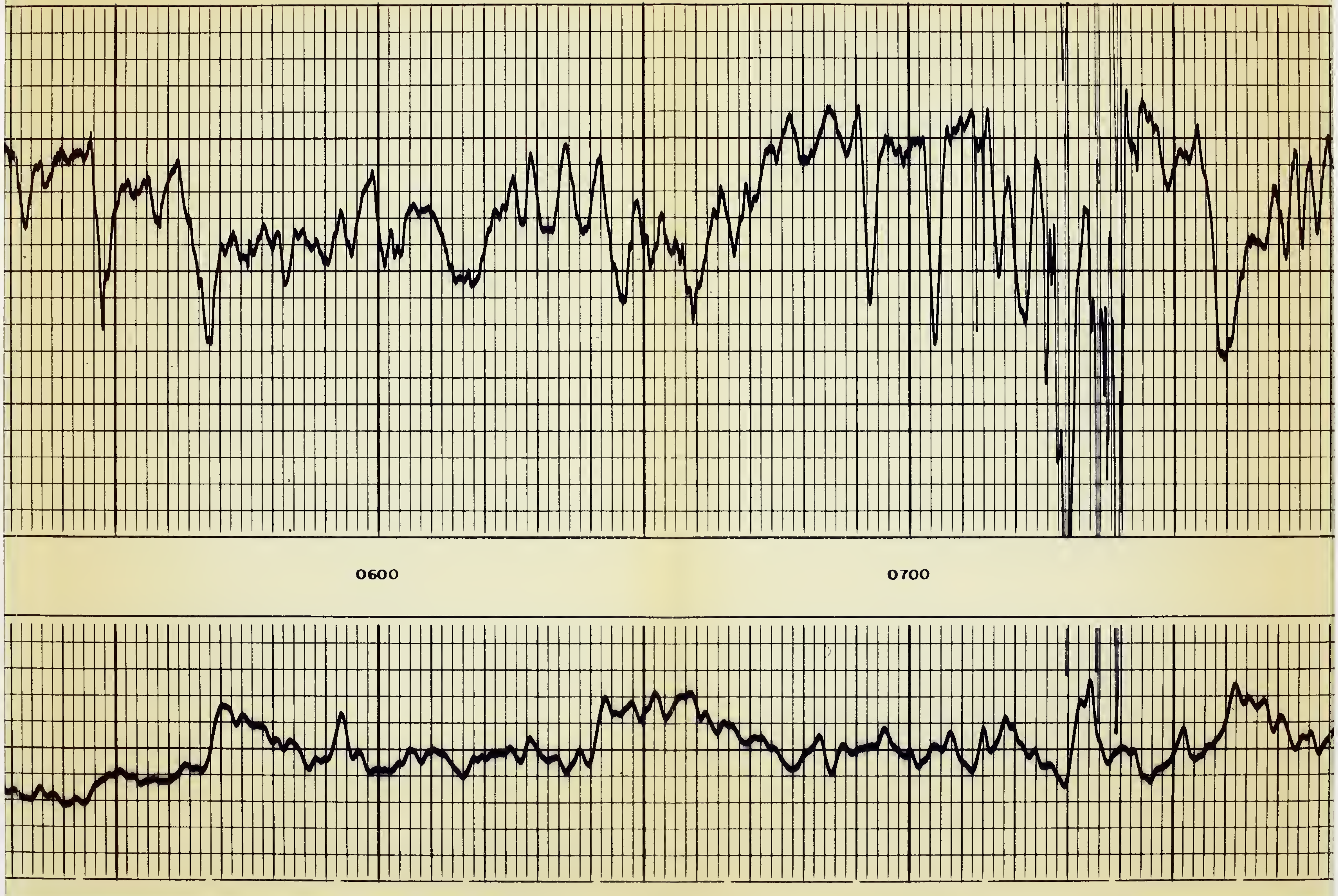
MICROSECONDS PER FOOT T__R₁__R₂__

150	100	50
250	200	150

DEPTH


0400
0500
0600
0700
0800
0900
GAMMA RAY
API UNITS
0
150
150
300


DETAIL LOG
5″ = 100′
INTERVAL TRANSIT TIME
MICROSECONDS PER FOOT
T
R1
R2
150
100
50
250
200
150
INTERGRATED TRAVEL TIME
DEPTH
0400
0500
GAMMA RAY
API UNITS
0
150
15C
300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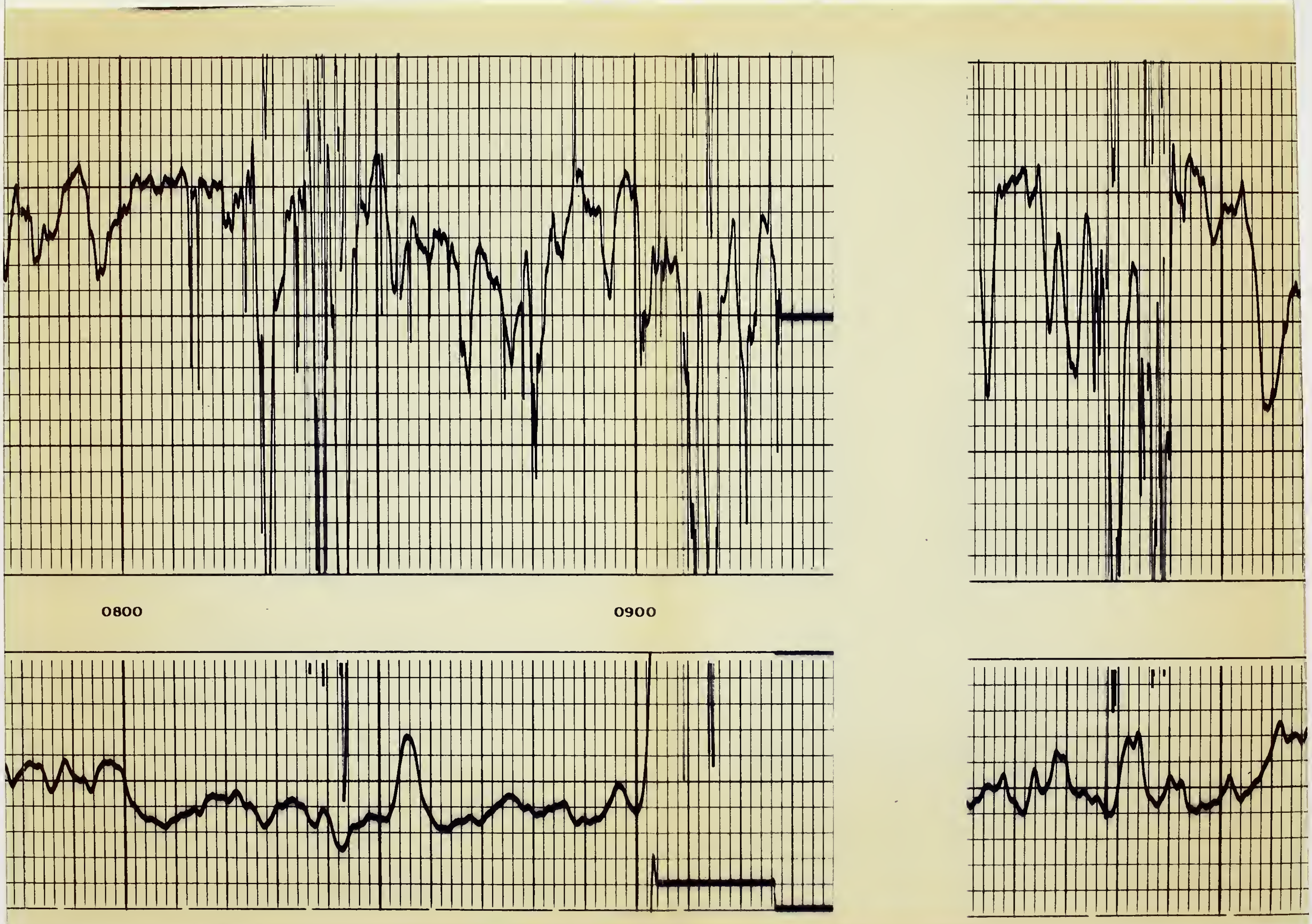
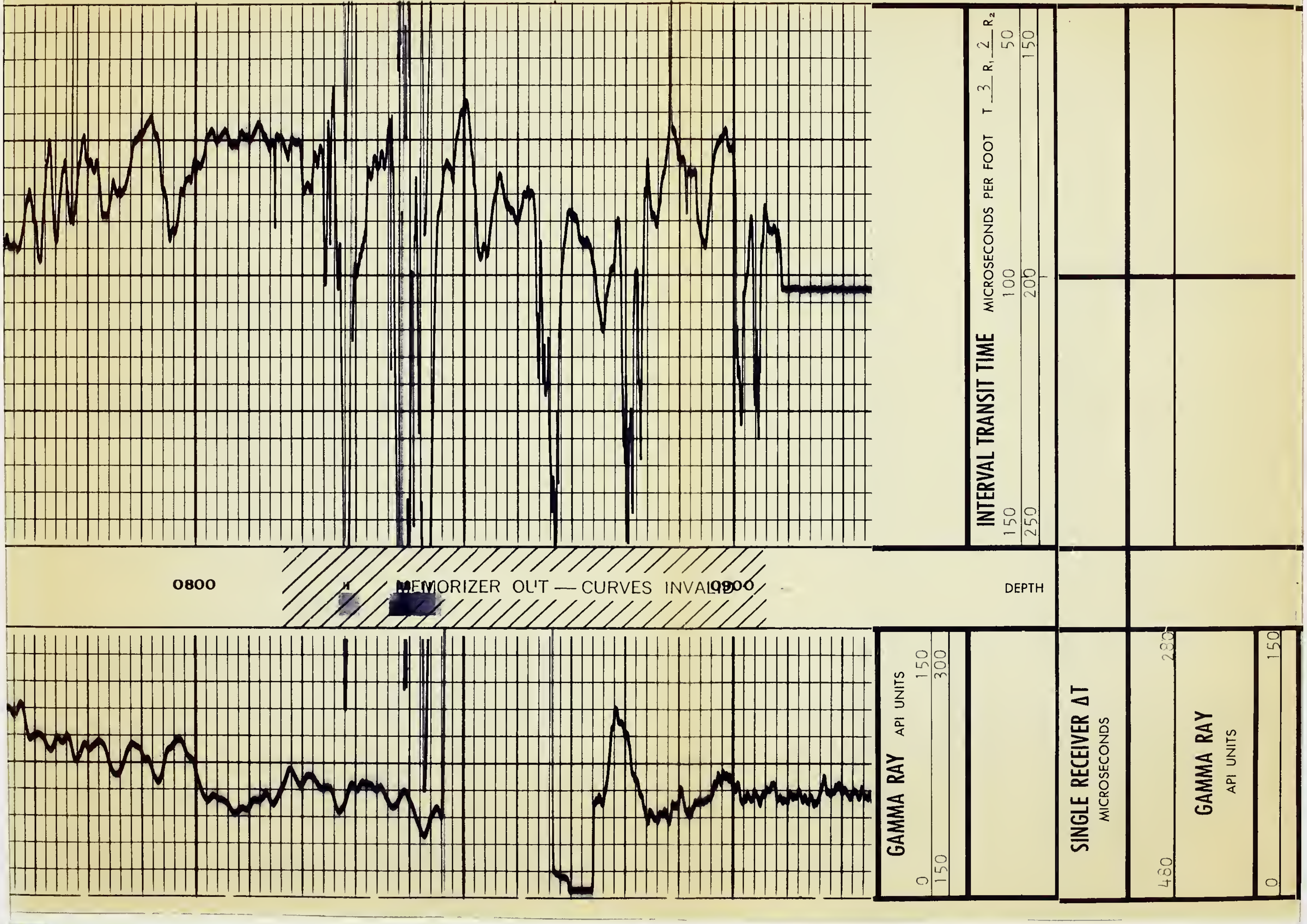
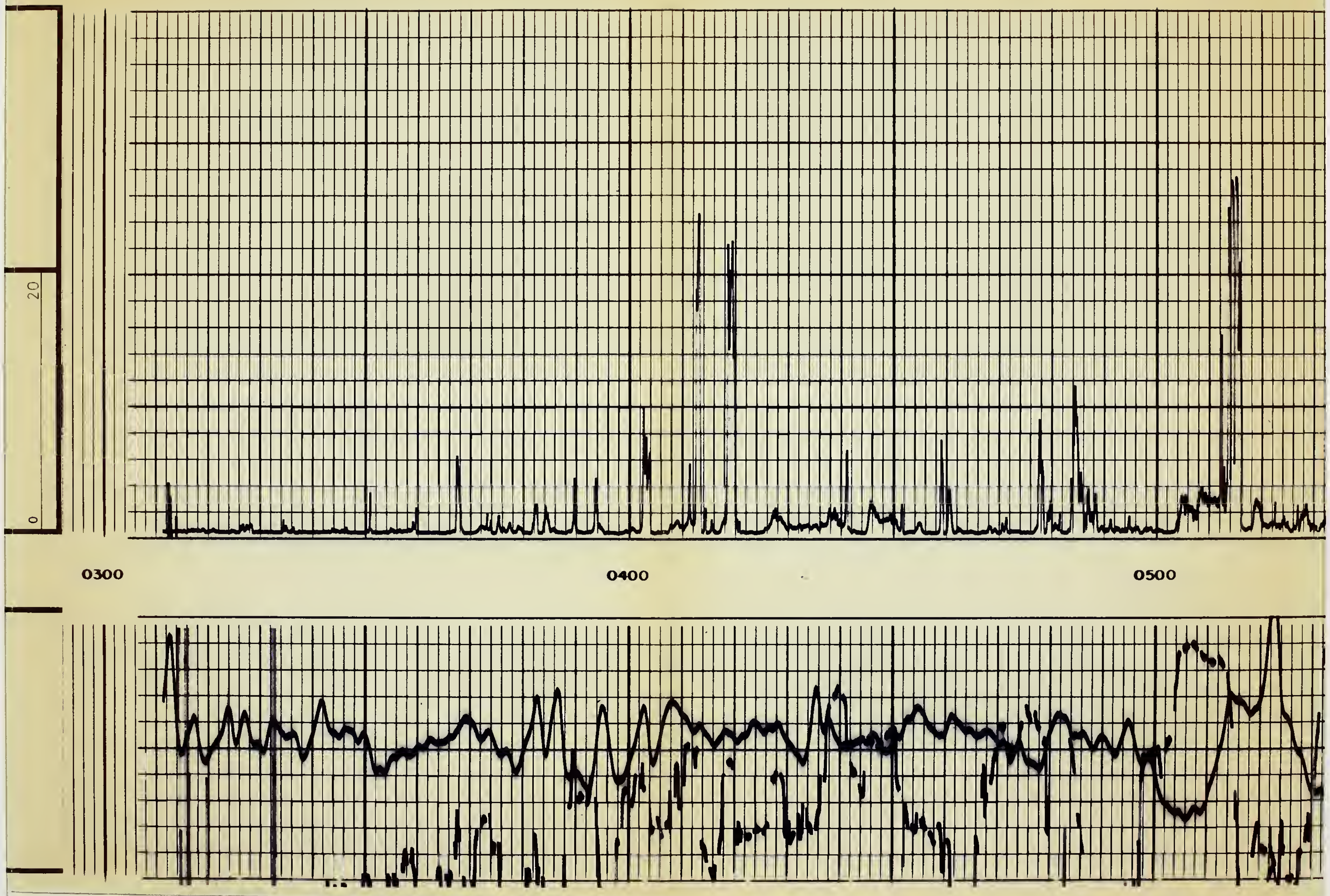
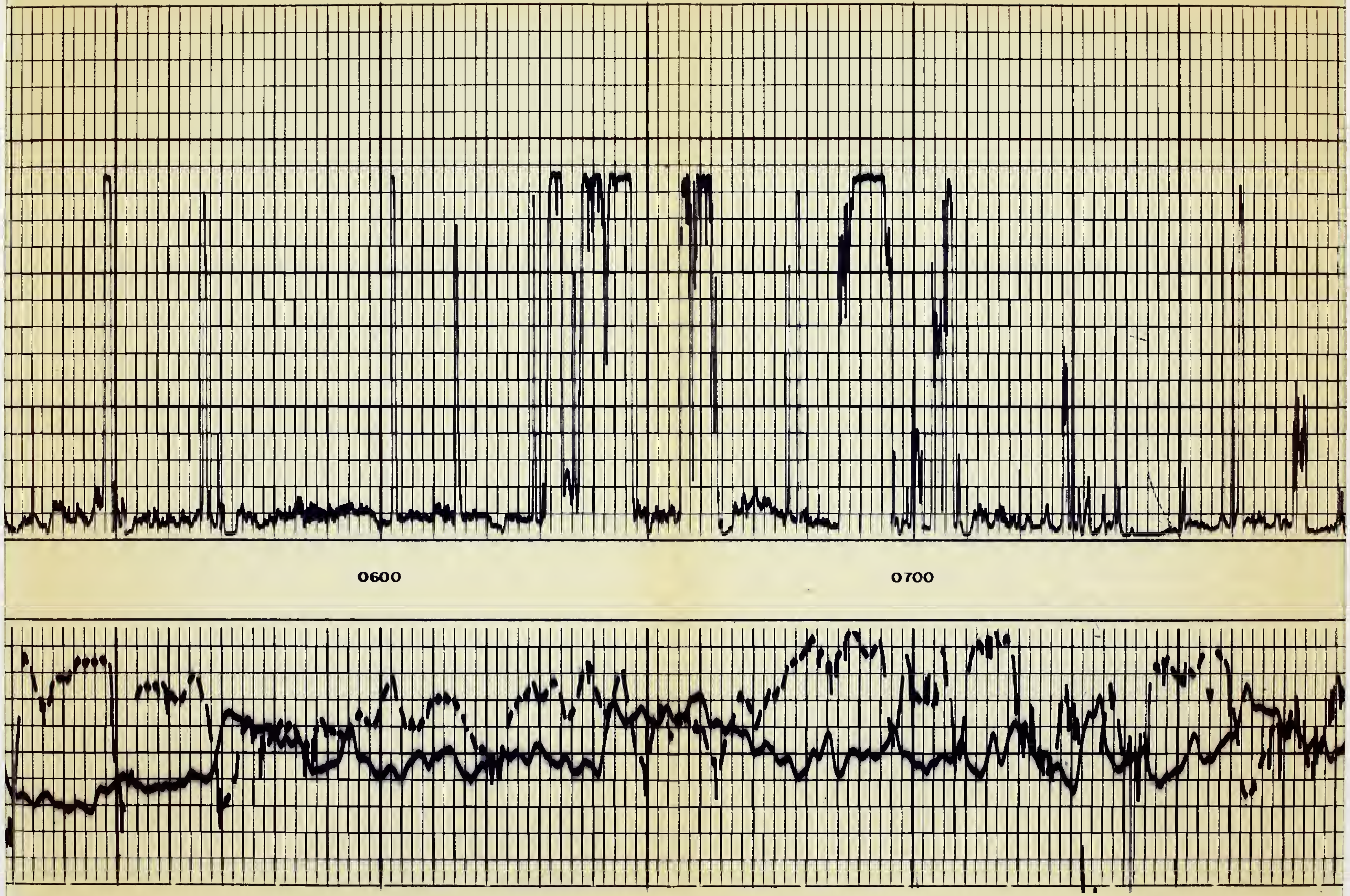
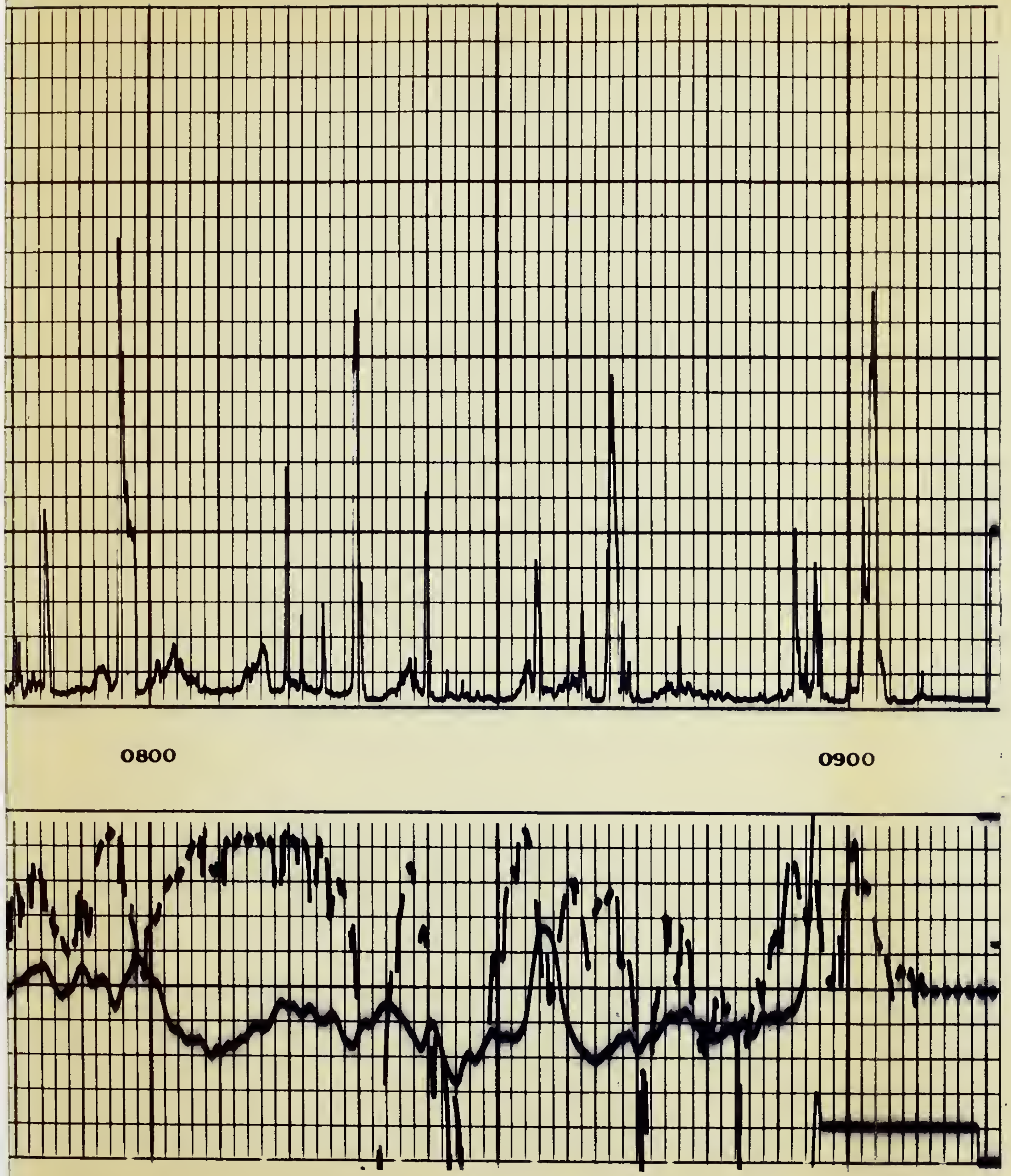
0700

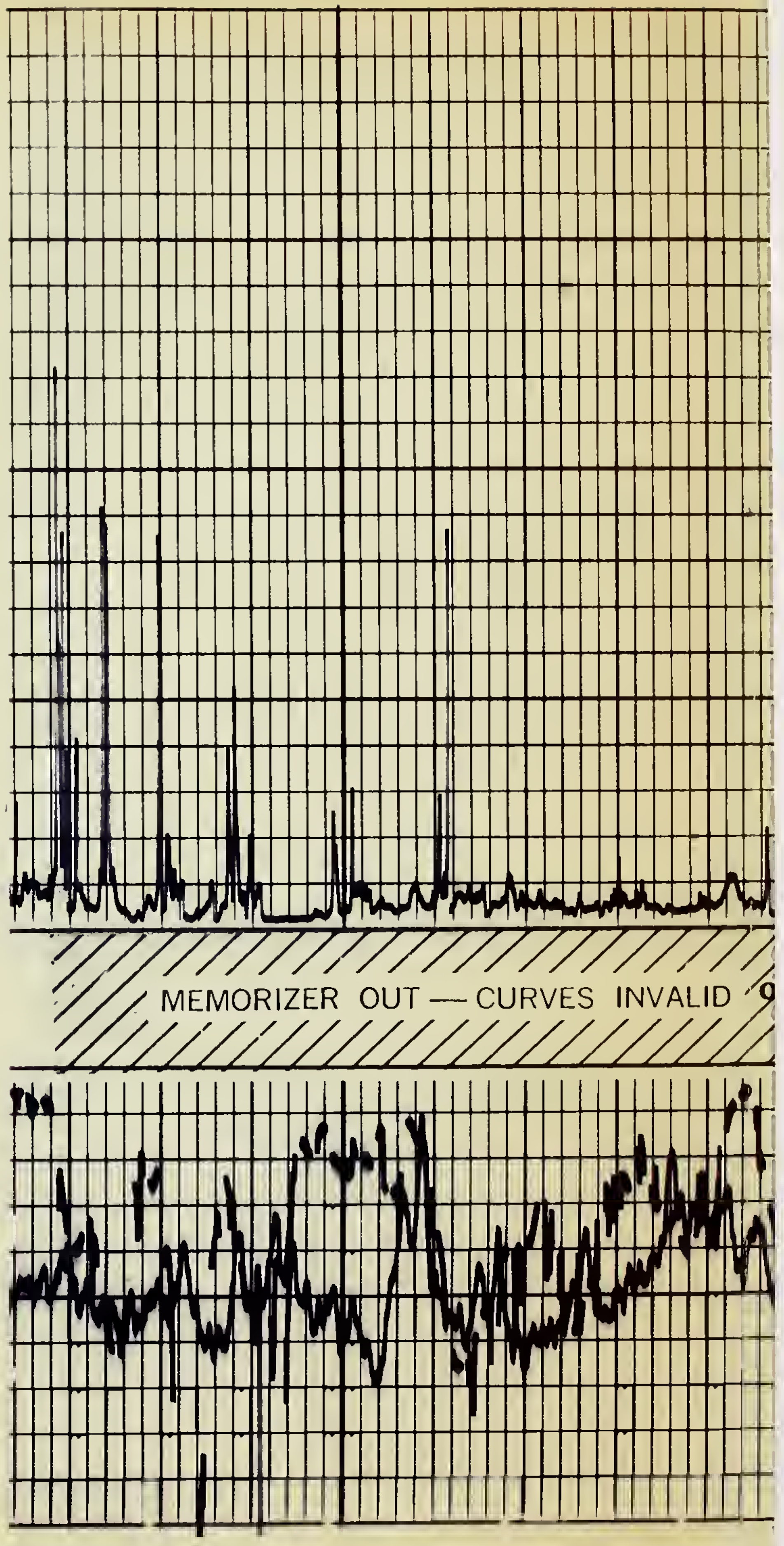

0800
0900

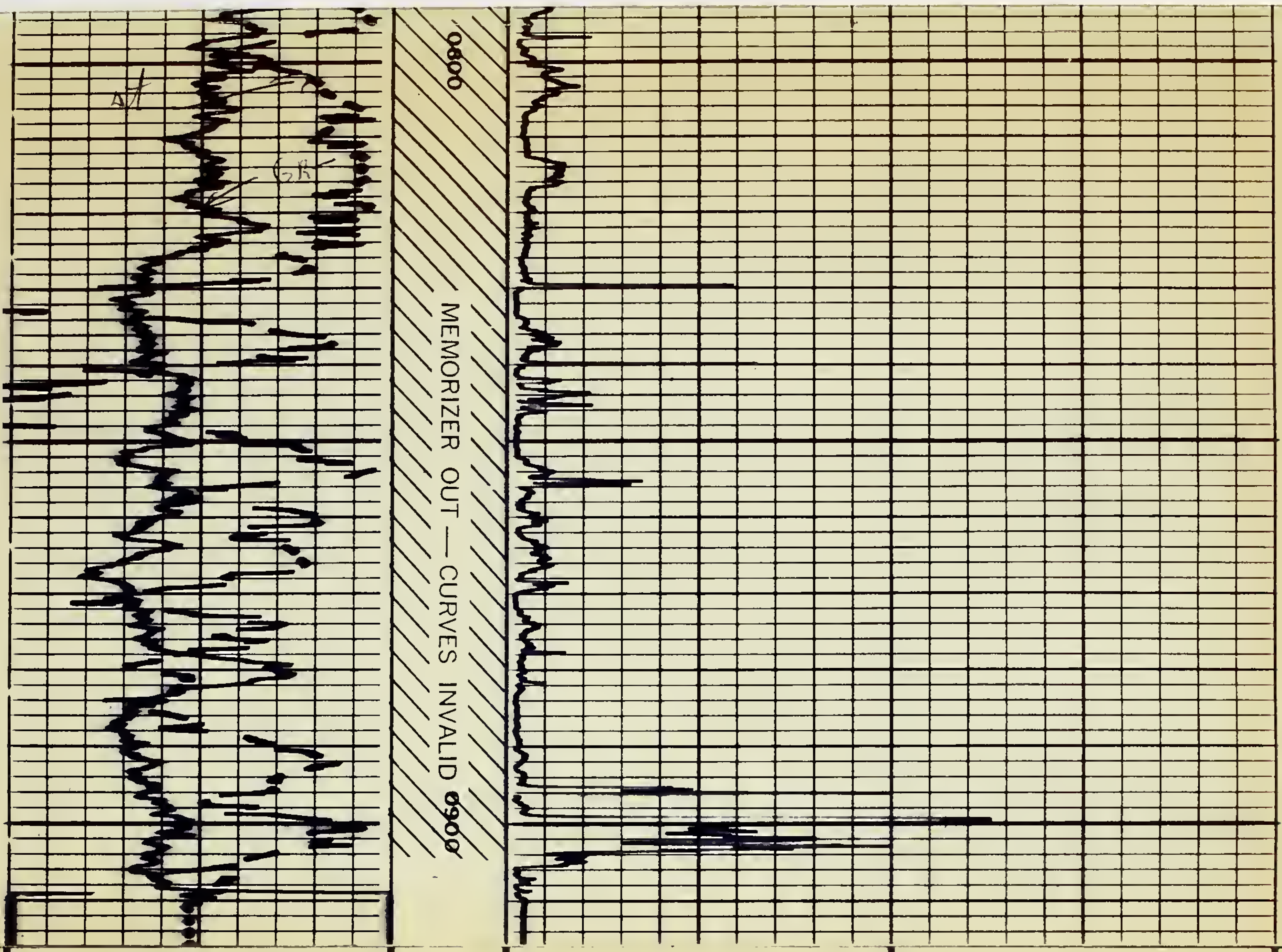

INTERVAL TRANSIT TIME
MICROSECONDS PER FOOT
T 3 R1 2 R2
150
100
50
250
200
150
0800
MEMORIZER OUT — CURVES INVALID
0900
DEPTH
GAMMA RAY
API UNITS
0
150
150
300
SINGLE RECEIVER ΔT
MICROSECONDS
480
280
GAMMA RAY
API UNITS
0
150


20
0
0300
0400
0500


0600
0700


0800
0900


MEMORIZER OUT — CURVES INVALID



SINGLE RECEIVER ΔT
MICROSECONDS

480 280

GAMMA RAY
API UNITS

0 150

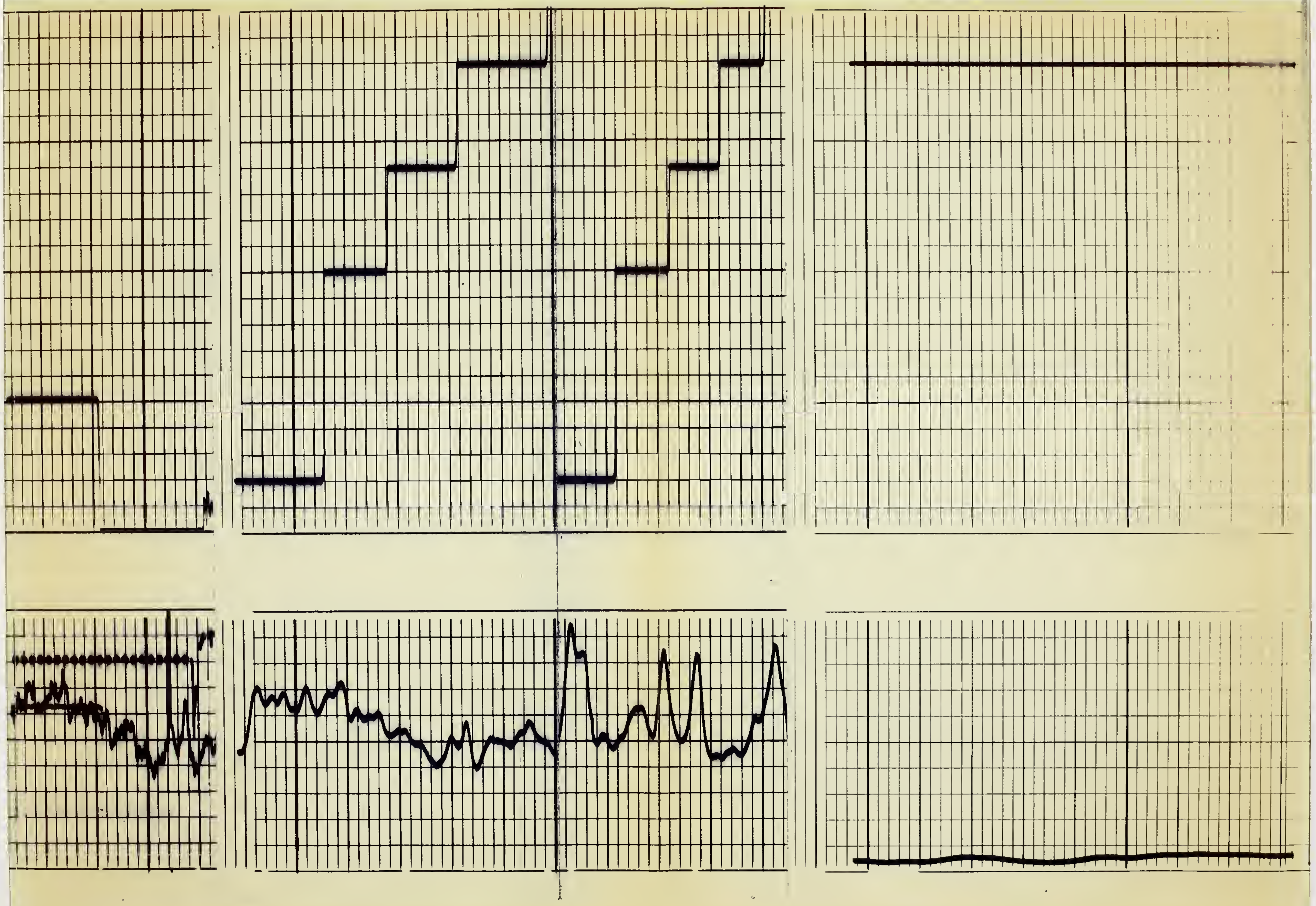
AMPLITUDE MILLIVOLTS

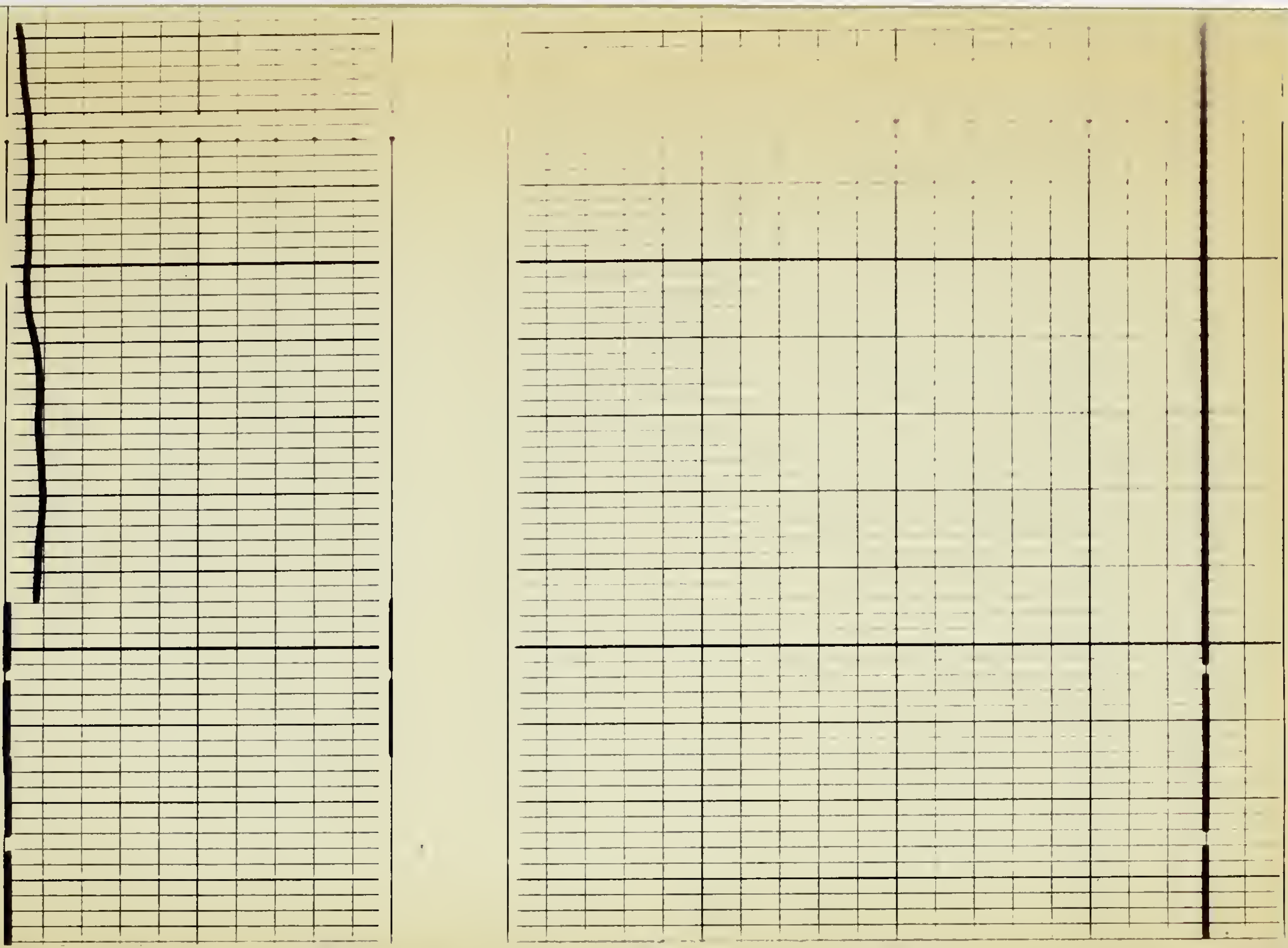
0 20

COMPANY ATLANTIC RICHFIELD COMPANY
WELL SORGHUM GULCH #19
FIELD SORGHUM GULCH
COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 928
SCHL. TD 936
DRLR TD 920
Elev:
KB ---
DF ---
GL 6370

CALIBRATION RECORD





CALIBRATION RECORD

COMPANY ATLANTIC RICHFIELD COMPANY
WELL SORGHUM GULCH #19
FIELD SORGHUM GULCH
COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 928
SCHL. TD 936
DRLR TD 920
Elev:
KB ---
DF ---
GL 6370

SWS-1129-D

Schlumberger

LATEROLOG

COUNTY RIO BLANCO
FIELD or LOCATION SORGHUM GULCH
WELL SORGHUM GULCH #19
COMPANY ATLANTIC RICHFIELD

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #19

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

LOCATION NW NW NW

Sec. Twp. Rge.

Other Services:
BHC-GR, TEMP
LL-7
FDC-GR

Permanent Datum: G.L., Elev. 6370
Log Measured From G.L., 0 Ft. Above Perm. Datum
Drilling Measured From G.L.

Elev.: K.B. ---
D.F. ----
G.L. 6370

Date	9/24/74			
Run No.	ONE			
Depth—Driller	920			
Depth—Logger	928			
Btm. Log Interval	924			
Top Log Interval	152			
Casing—Driller	7" @ 150	@	@	@
Casing—Logger	152			
Bit Size	6 1/4			
Type Fluid in Hole	WATER			
Dens. | Visc.	-- | ---	|	|	|
pH | Fluid Loss	---- | -- ml	| ml	| ml	| ml
Source of Sample	--			
R_m @ Meas. Temp.	--- @ -- °F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	- @ -- °F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	-- @ °F	@ °F	@ °F	@ °F
Source: R_{mf} | R_{mc}	--- | --	|	|	|
R_m @ BHT	---- @ -- °F	@ °F	@ °F	@ °F
Time Since Circ.	---			
Max. Rec. Temp.	81.5 °F	°F	°F	°F
Equip. | Location	7683 | VERN	|	|	|
Recorded By	HAUGAARD			
Witnessed By	ELLARD, TAIT			

SWS-1366-F

FOLD HERE

The well name, location and borehole reference data were furnished by the customer.

REMARKS SP SPACED FROM SEPARATE CURRENT RUN.

Changes in Mud Type or Additional Samples

Date	Sample No.	Depth—Driller	Type Fluid in Hole	Dens. | Visc.	pH | Fluid Loss	Source of Sample	R_m @ Meas. Temp.	R_{mf} @ Meas. Temp.	R_{mc} @ Meas. Temp.	Source: R_{mf} | R_{mc}	R_m @ BHT	R_{mf} @ BHT	R_{mc} @ BHT
					ml		@ °F	@ °F	@ °F		@ °F	@ °F	@ °F
							@ °F	@ °F	@ °F		@ °F	@ °F	@ °F

Scale Changes

Type Log	Depth	Scale Up Hole	Scale Down Hole

Equipment Data

Run No.	Tool Type	Pad Type	Tool Pos.	Other

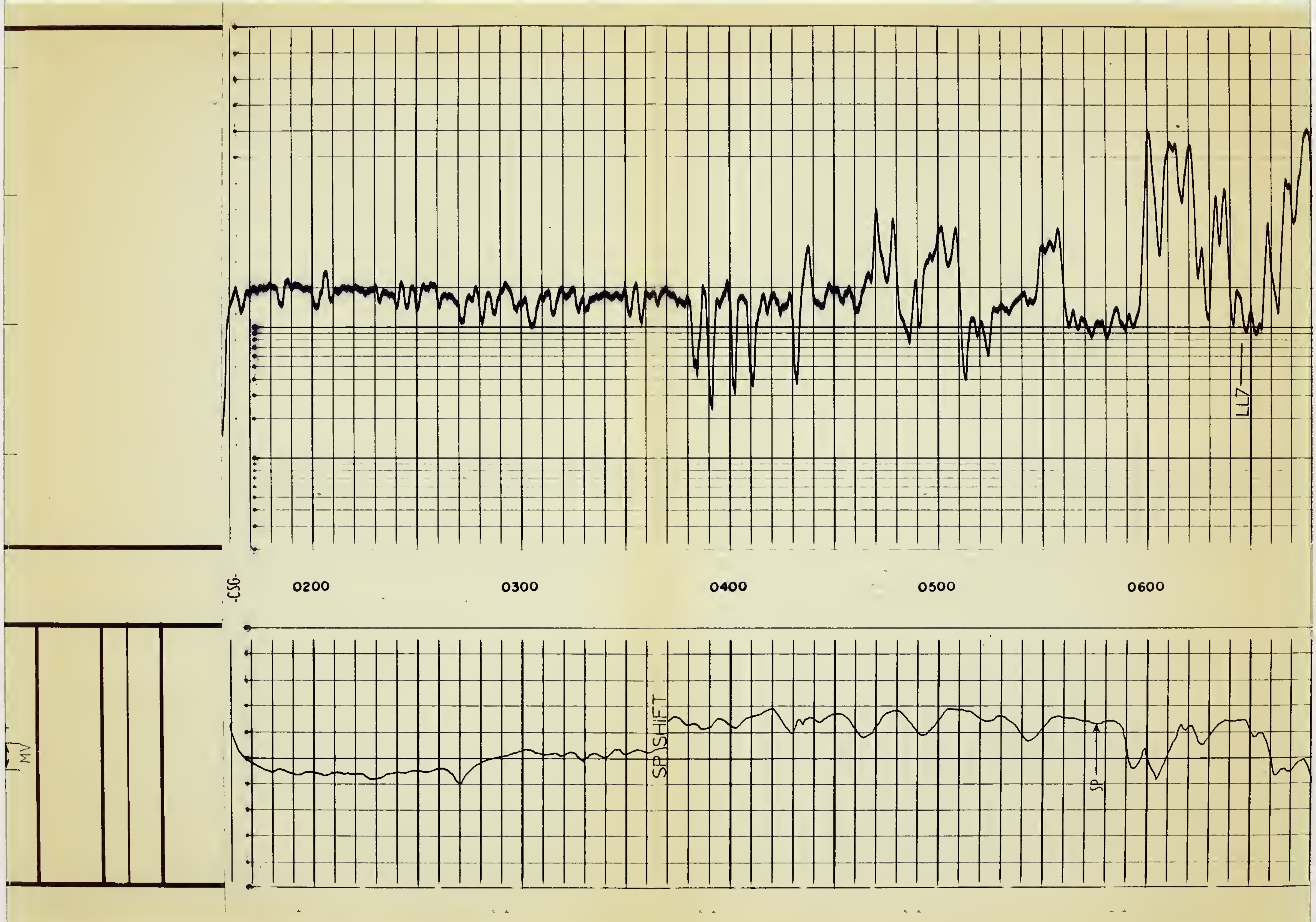
Equip. Used: CART. No.
PANEL No.
SONDE No.
Spacing: BEAM WIDTH:
GUARD LENGTH:

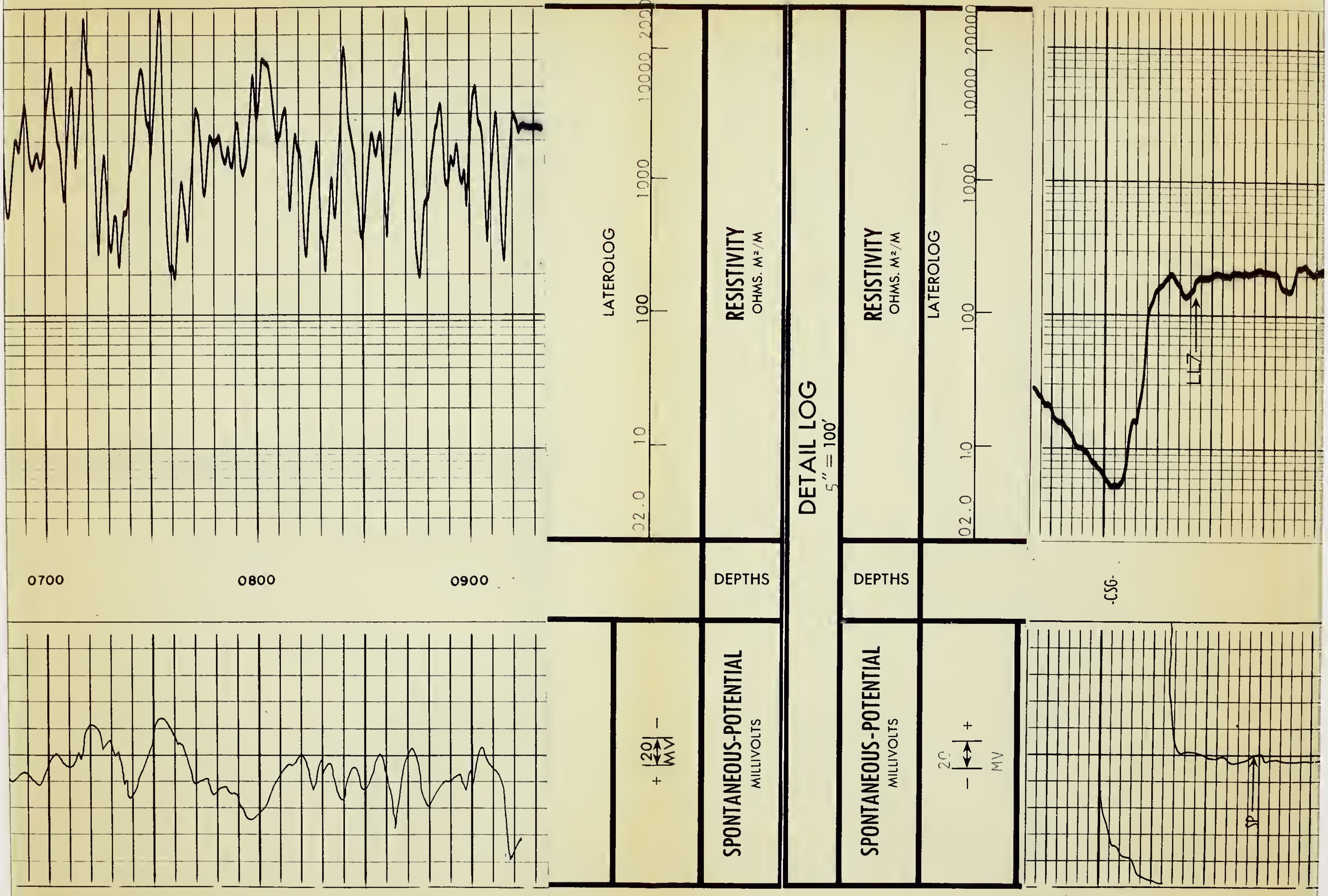
RESISTIVITY
ohms. m²/m

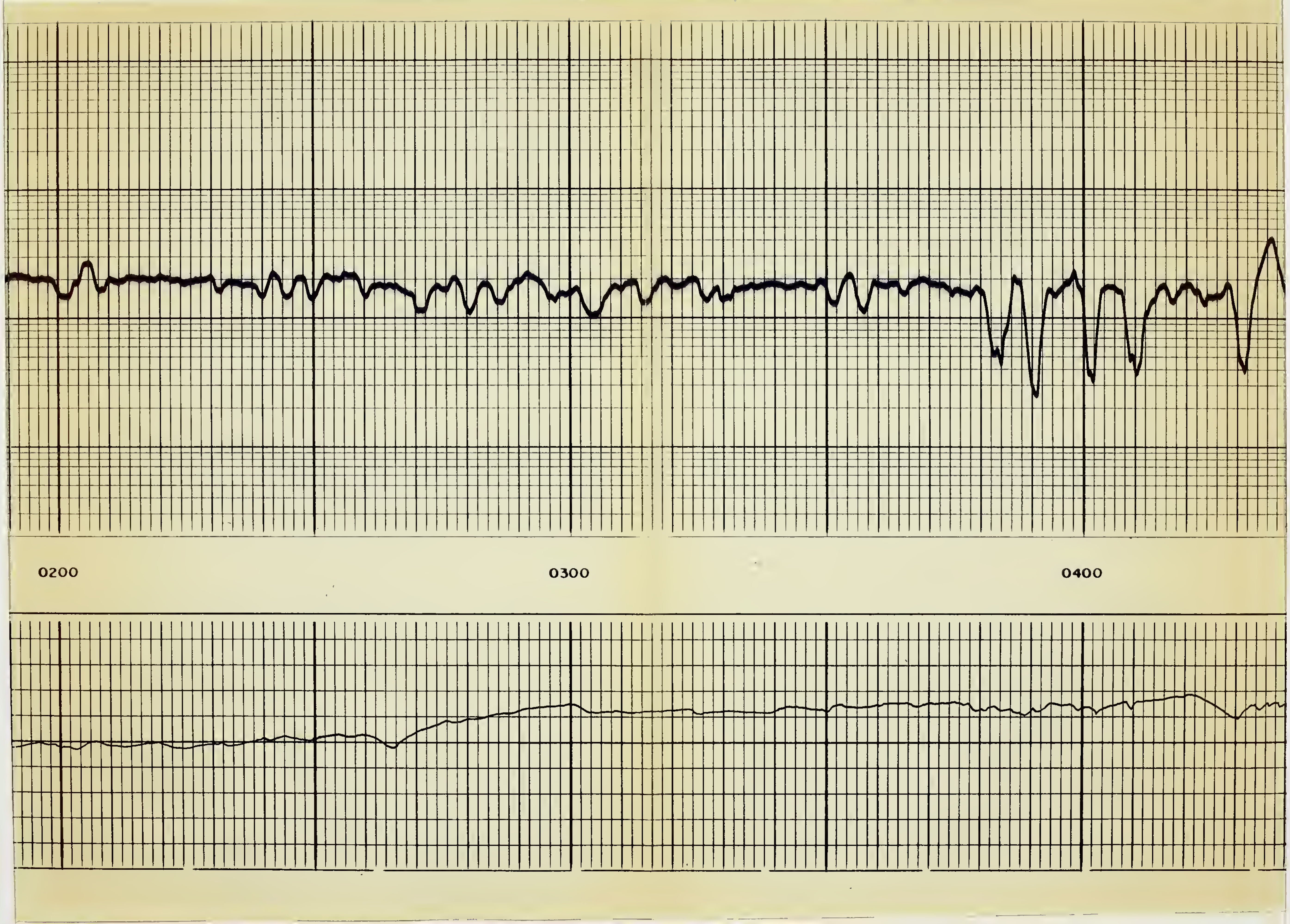
LATEROLOG

Depths

SPONTANEOUS POTENTIAL
millivolts


-CSG-
0200
0300
0400
0500
0600
LL7
MV
SP SHIFT
SP


LATEROLOG
RESISTIVITY
OHMS. M²/M
20000
10000
1000
100
10
02.0
DETAIL LOG
5" = 100'
DEPTHS
0700
0800
0900
-CSG-
LL7
SPONTANEOUS-POTENTIAL
MILLIVOLTS
+ 20 MV −
− 20 MV +
SP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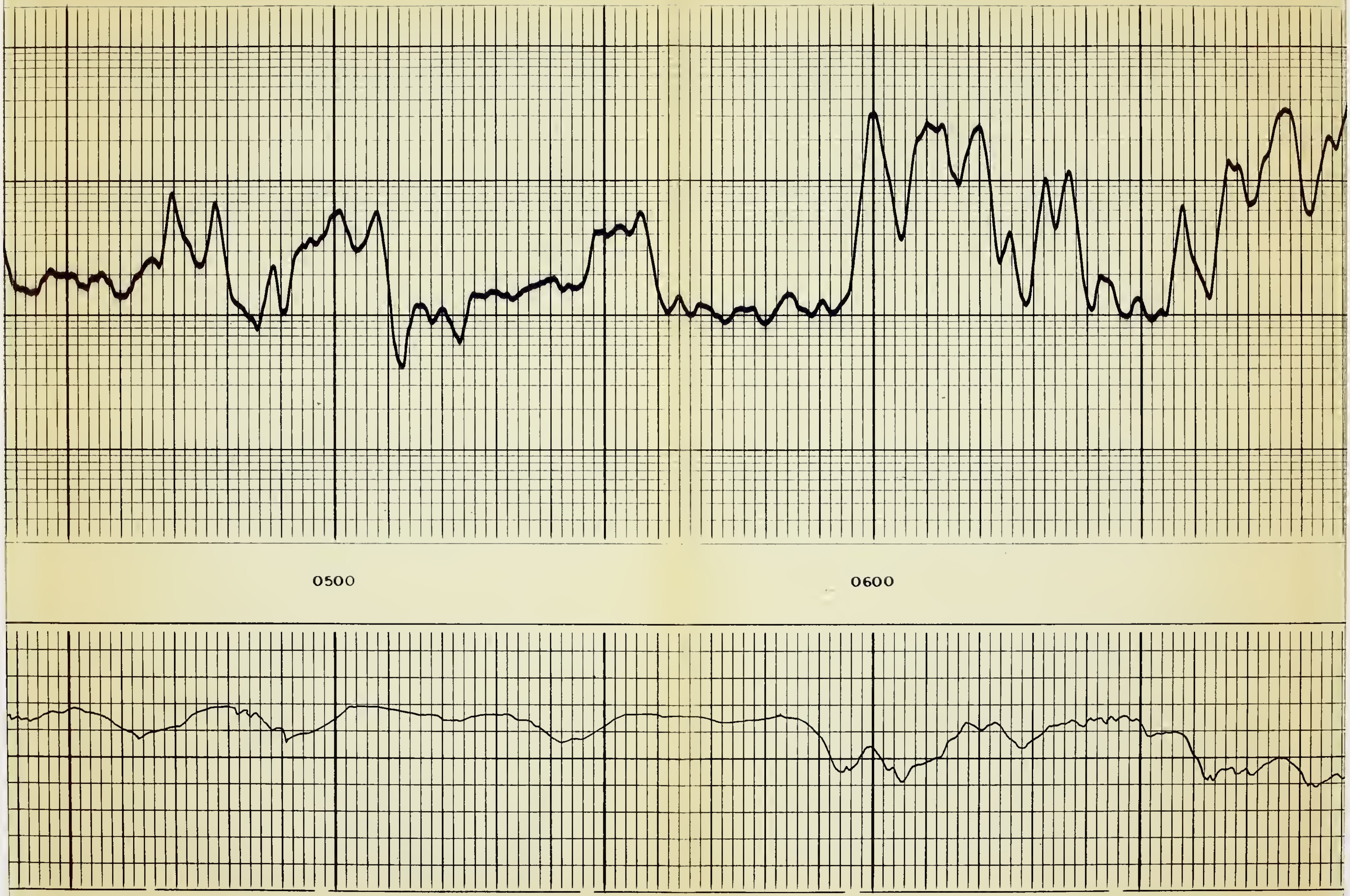
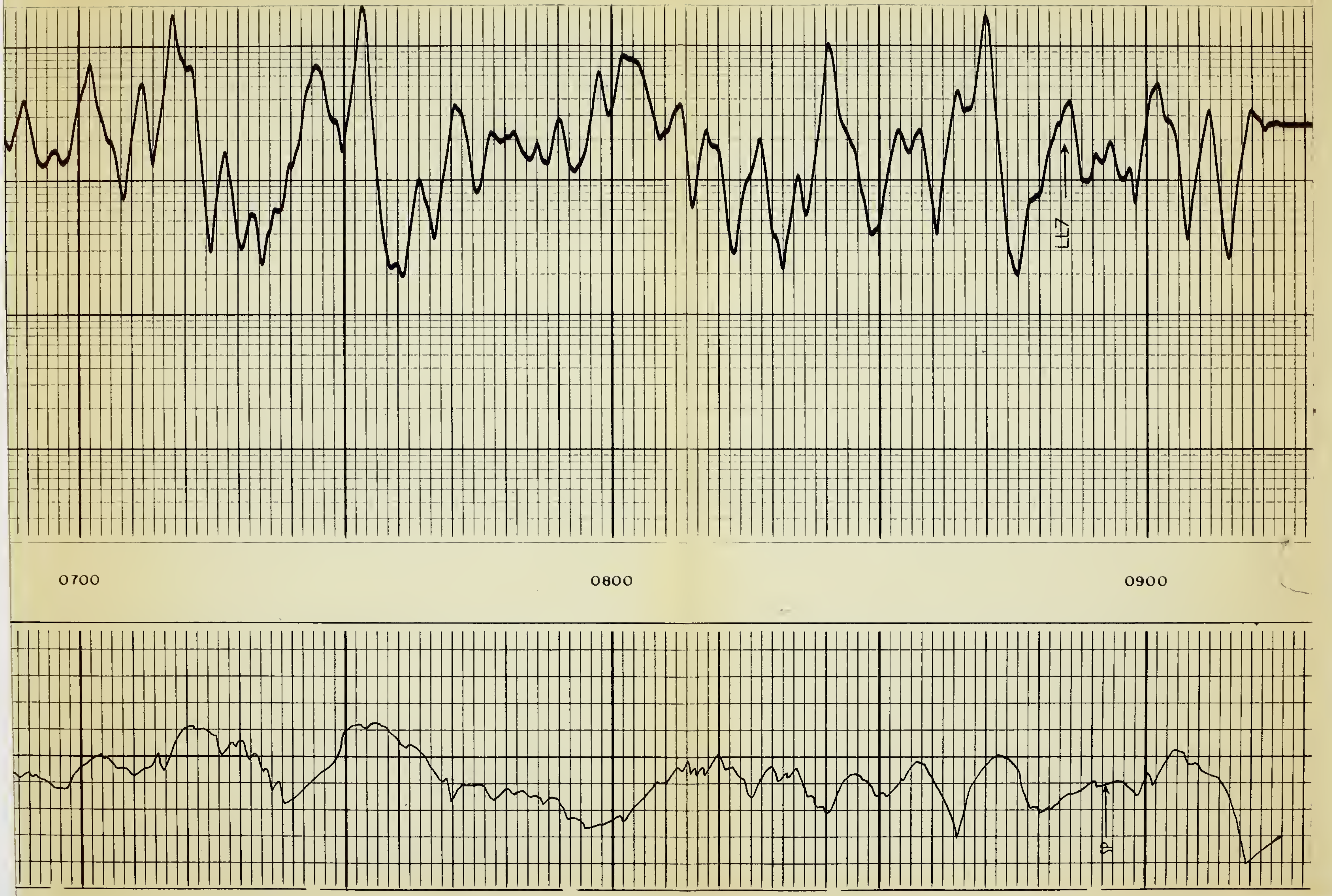
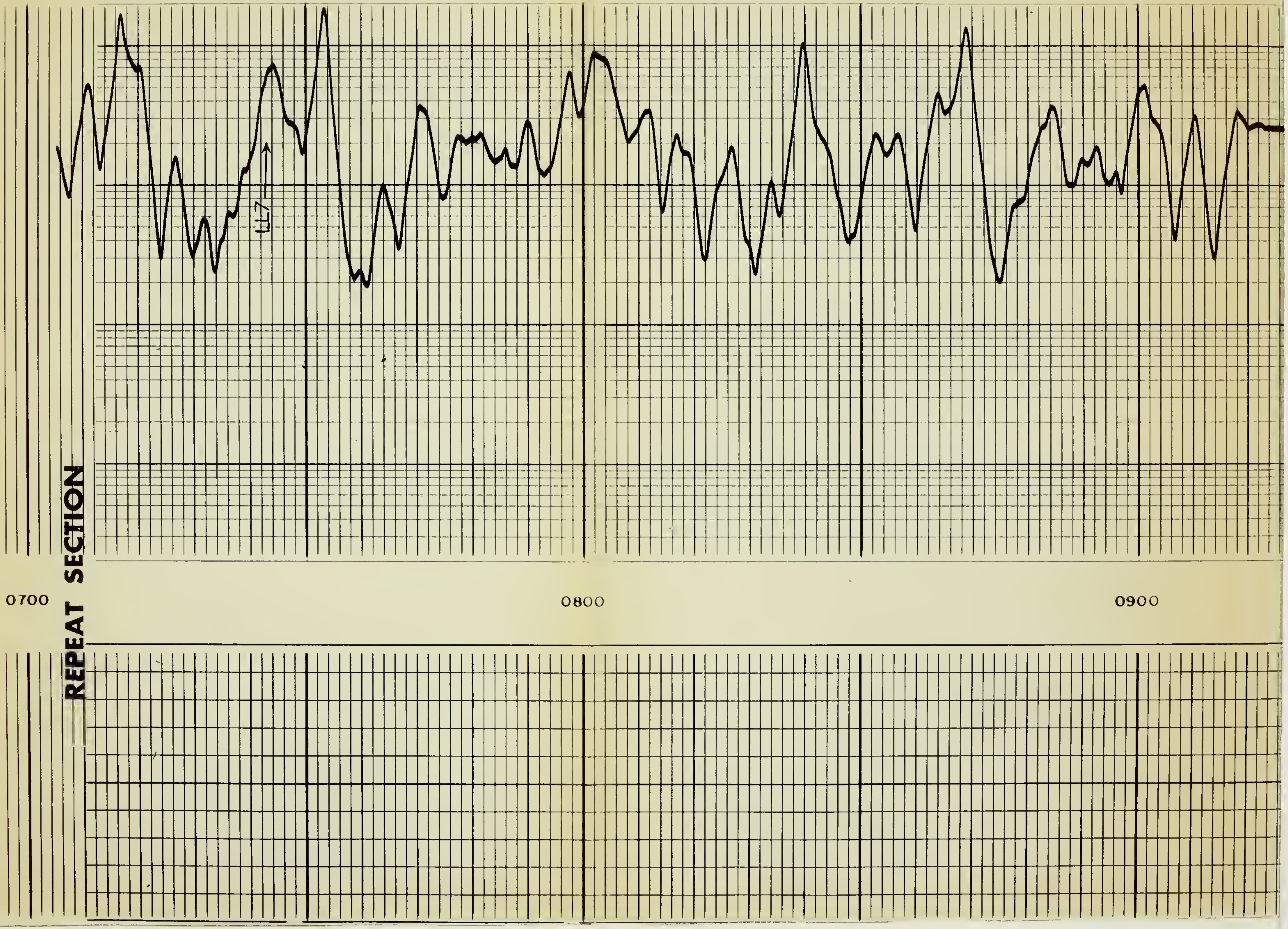
0300
0400


0500
0600


LL7
0700
0800
0900
SP


LL7
REPEAT SECTION
0700
0800
0900

LATEROLOG

02.0 10 100 1000 10000 20000

20
– MV +

SPONTANEOUS-POTENTIAL
MILLIVOLTS

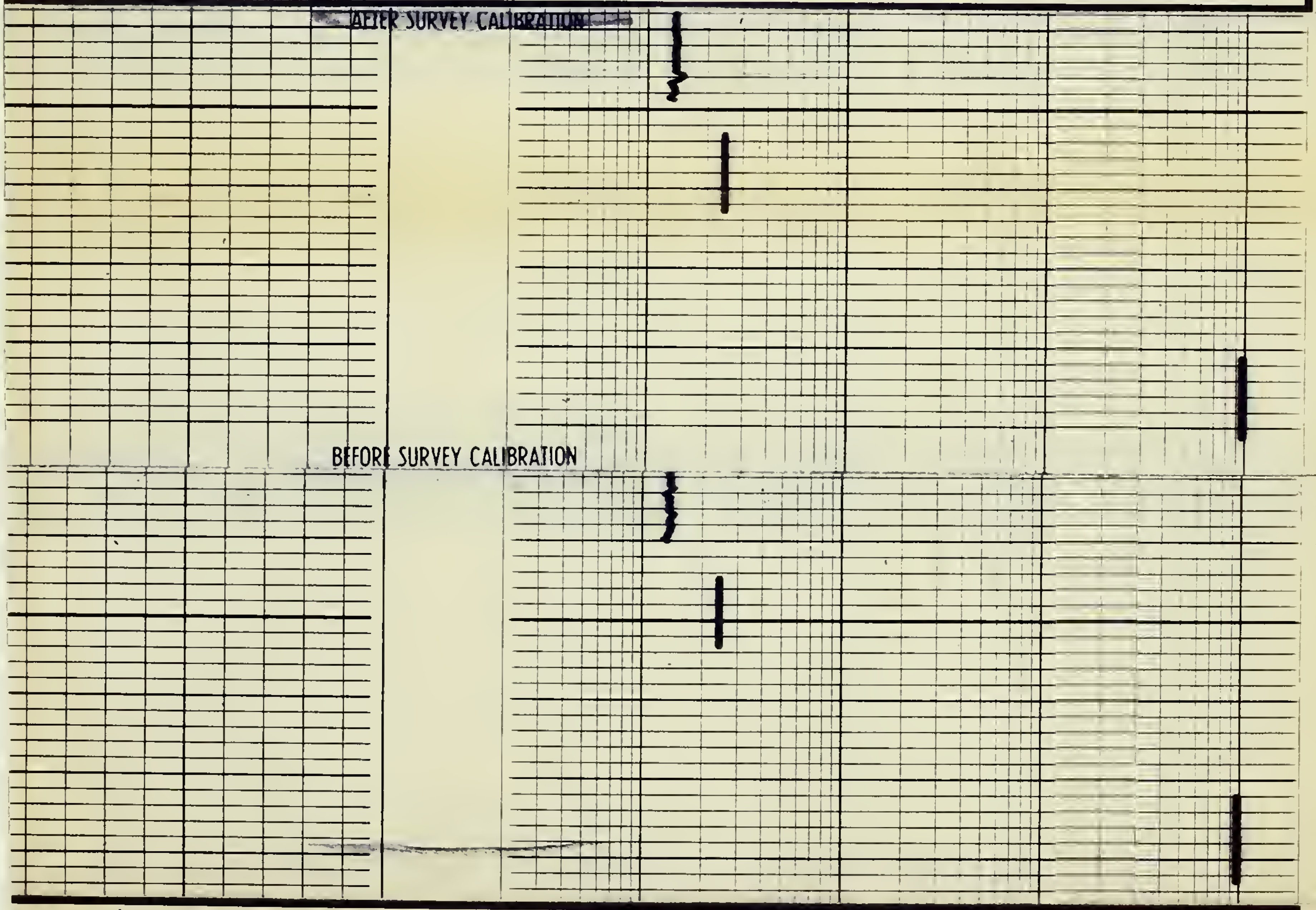
DEPTHS

RESISTIVITY
OHMS. M²/M

COMPANY ATLANTIC RICHFIELD COMPAN
WELL SORGHUM GULCH #19
FIELD SORGHUM GULCH
COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 924
SCHL. TD 928
DRLR TD 920
Elev:
KB ---
DF --
GL 6370

CALIBRATION RECORD



CALIBRATION RECORD

COMPANY ATLANTIC RICHFIELD COMPAN
WELL SORGHUM GULCH #19
FIELD SORGHUM GULCH
COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 924
SCHL. TD 928
DRLR TD 920
Elev:
KB
DF
GL 6370

Schlumberger

COMPENSATED
FORMATION DENSITY LOG
Gamma-Gamma

COUNTY RIO BLANCO
FIELD or LOCATION SORGHUM GULCH
WELL SORGHUM GULCH #19
COMPANY ATLANTIC RICHFIELD COMPANY

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #19

FIELD SORGHUM GULCH

COUNTY RIO BLANCO **STATE** COLORADO

Location:
NW NW NW
Sec. 5 Twp. 3S Rge. 96W

Other Services:
LL7
BHC-GR
AMP
TEMP

Permanent Datum: G.L. ; Elev.: 6370
Log Measured From G.L. , 0 Ft. Above Perm. Datum
Drilling Measured From G.L.

Elev.: K.B. --
D.F. --
G.L. 6370

Date	9/24/74							
Run No.	ONE							
Depth—Driller	920							
Depth—Logger	922							
Btm. Log Interval	920							
Top Log Interval	152							
Casing—Driller	7 @ 150		@		@		@	
Casing—Logger	152							
Bit Size	6 1/4							
Type Fluid in Hole	WATER							
Fluid Level	FULL							
Dens. | Visc.	--	-						
pH | Fluid Los	--	- ml		ml		ml		ml
Source of Sample	--							
R_m @ Meas. Temp.	-- @ -- °F		@ °F		@ °F		@ °F	
R_{mf} @ Meas. Temp.	-- @ -- °F		@ °F		@ °F		@ °F	
R_{mc} @ Meas. Temp.	-- @ -- °F		@ °F		@ °F		@ °F	
Source: R_{mf} | R_{mc}	--	--						
R_m @ BHT	-- @ - °F		@ °F		@ F		@ °F	
Time Since Circ.	--							
Max. Rec. Temp.	81.5 °F		°F		°F		°F	
Equip. | Location	7163	VERN						
Recorded By	HAUGAARD							
Witnessed By	ELLARD, TAIT							

The well name location and borehole reference data were furnished by the customer.

FOLD HERE

SCALE CHANGES

Type Log	Depth	Scale Up Hole	Scale Down Hole

LOGGING DATA

Liquid Density	Grain Density	FDC Selectors Hole Fluid	FDC Selectors Porosity Scale	From	To

REMARKS
Service Order No. - 7033
API Serial No. -

CHANGES IN MUD TYPE OR ADDITIONAL SAMPLES

Date		
Sample No.		
Depth-Driller		
Type Fluid		
Source of Sample		
R_m @ Meas. Temp.	@ °F	@ °F
R_{mf} @ Meas. Temp.	@ °F	@ °F
R_{mc} @ Meas. Temp.	@ °F	@ °F
R_m @ BHT	@ °F	@ °F
Dens. | Visc.		
ph | Fluid Loss	ml	ml
% Water by Vol.		
% Oil by Vol.		
% Solids by Vol.		
Solids Av. Sp. Gr.		

EQUIPMENT DATA

Run No.	ONE		
Panel No.	EA-4-2		
Cart No.	EA-1.5		
Skid No.	D-320		
Sonde No.	E.-377		
Source	2936		
Calibrator	544		
GR Cart.	J-204		
TTR	---		
Mem Panel	ILP-A 163		

BIT SIZE/CASING DATA

Bit	From	To	Csg. Size	Csg. Wt.	From	To
6 1/4	920	150	7"	--	150	SURF

CALIBRATION DATA

Run No.	Gamma Ray			FDC — Before Log — ACPS		FDC — After Log — ACPS	
	API Scale	Background CPS	Total CPS	P_1	P_2	P_1	P_2
1	0-200	100	500	340	720	340	720
2							
3							
4							

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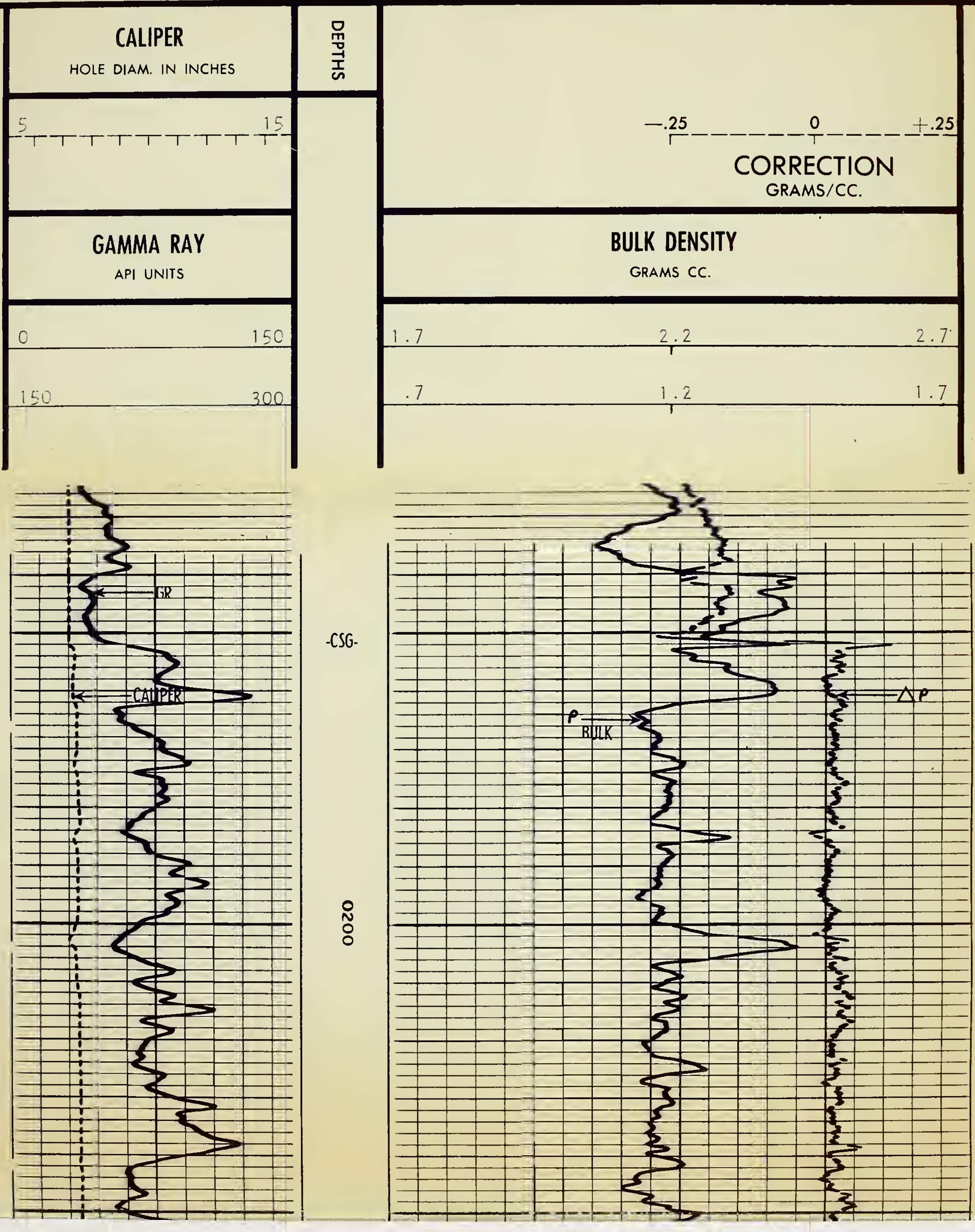

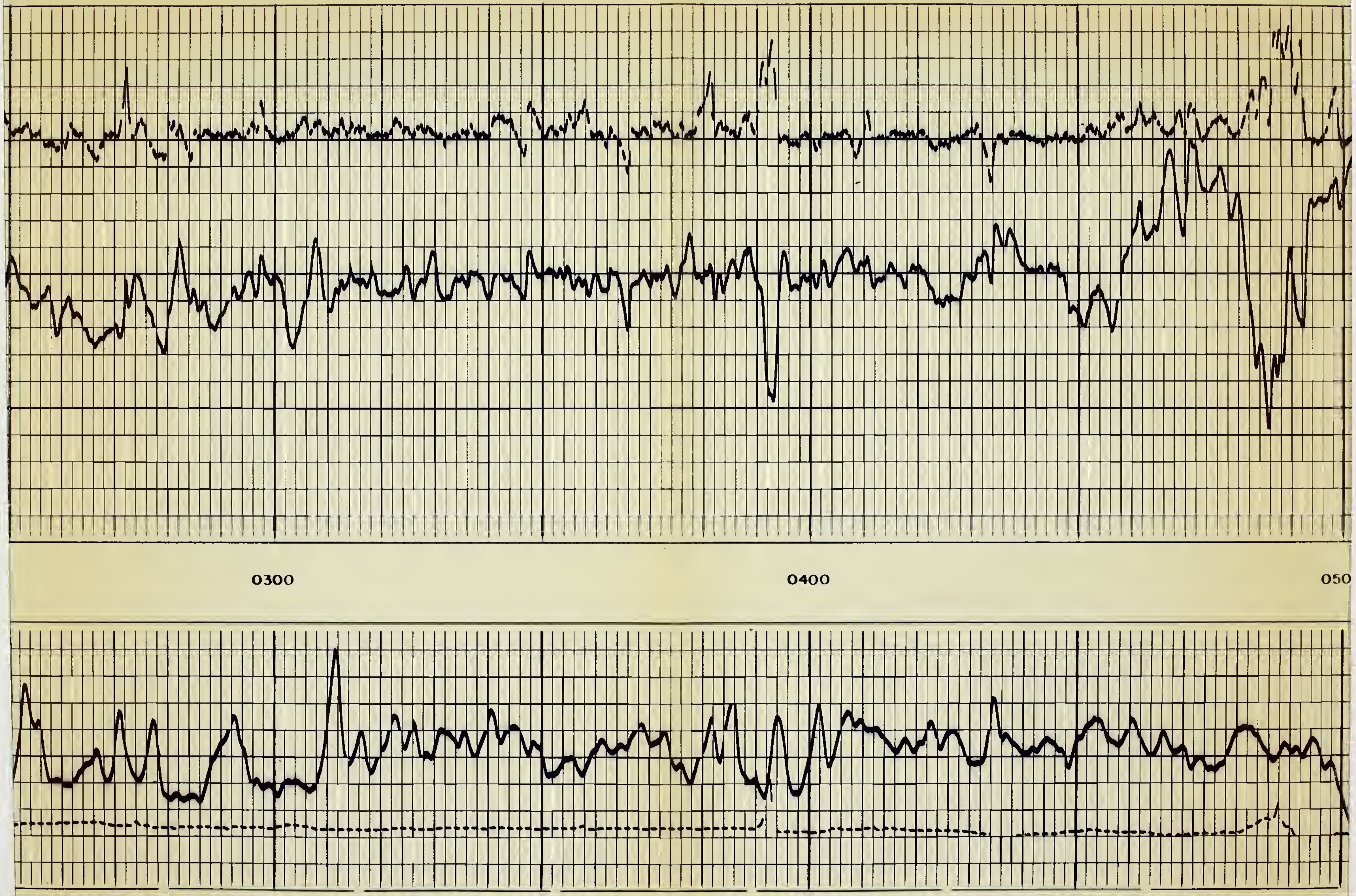
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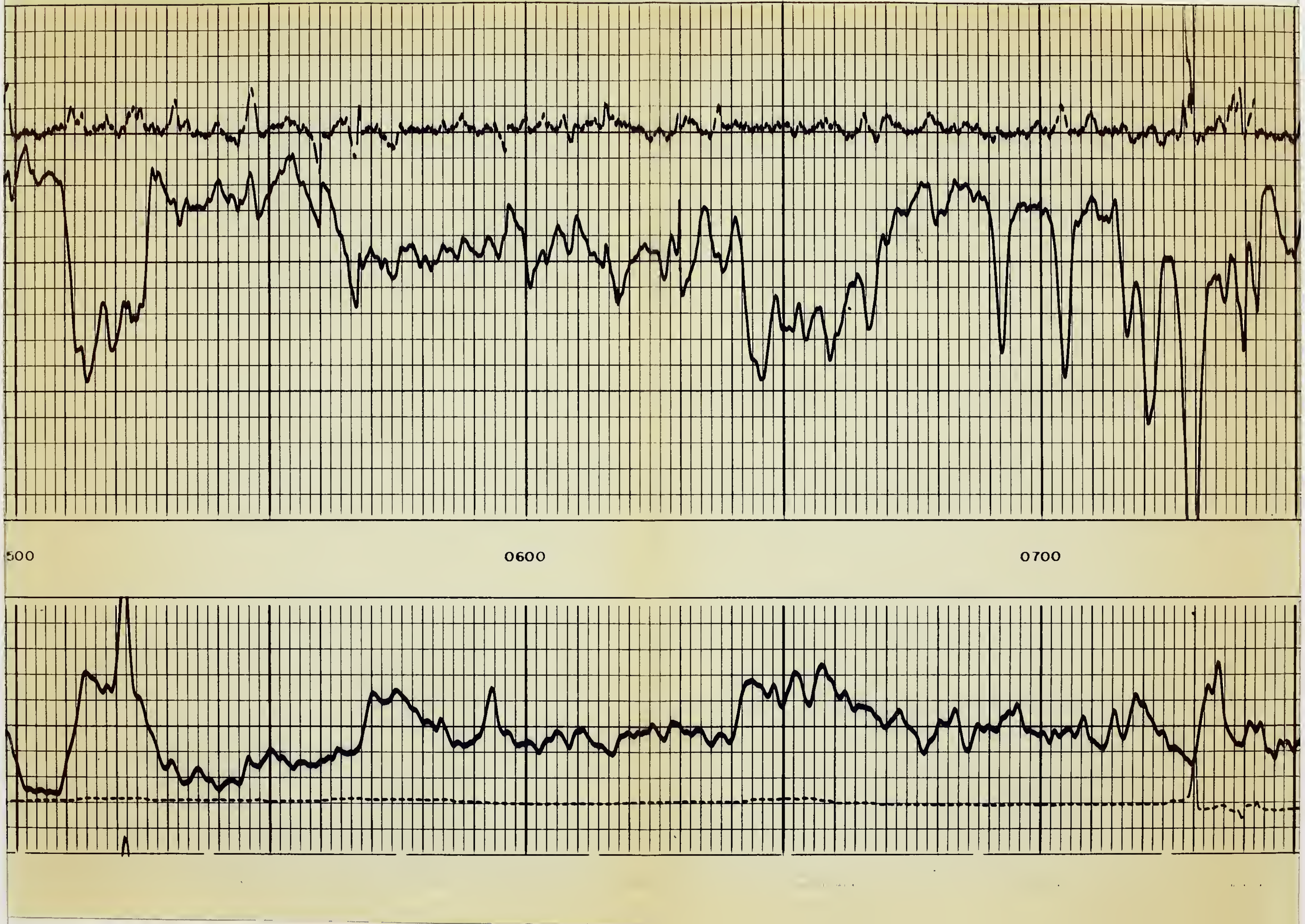
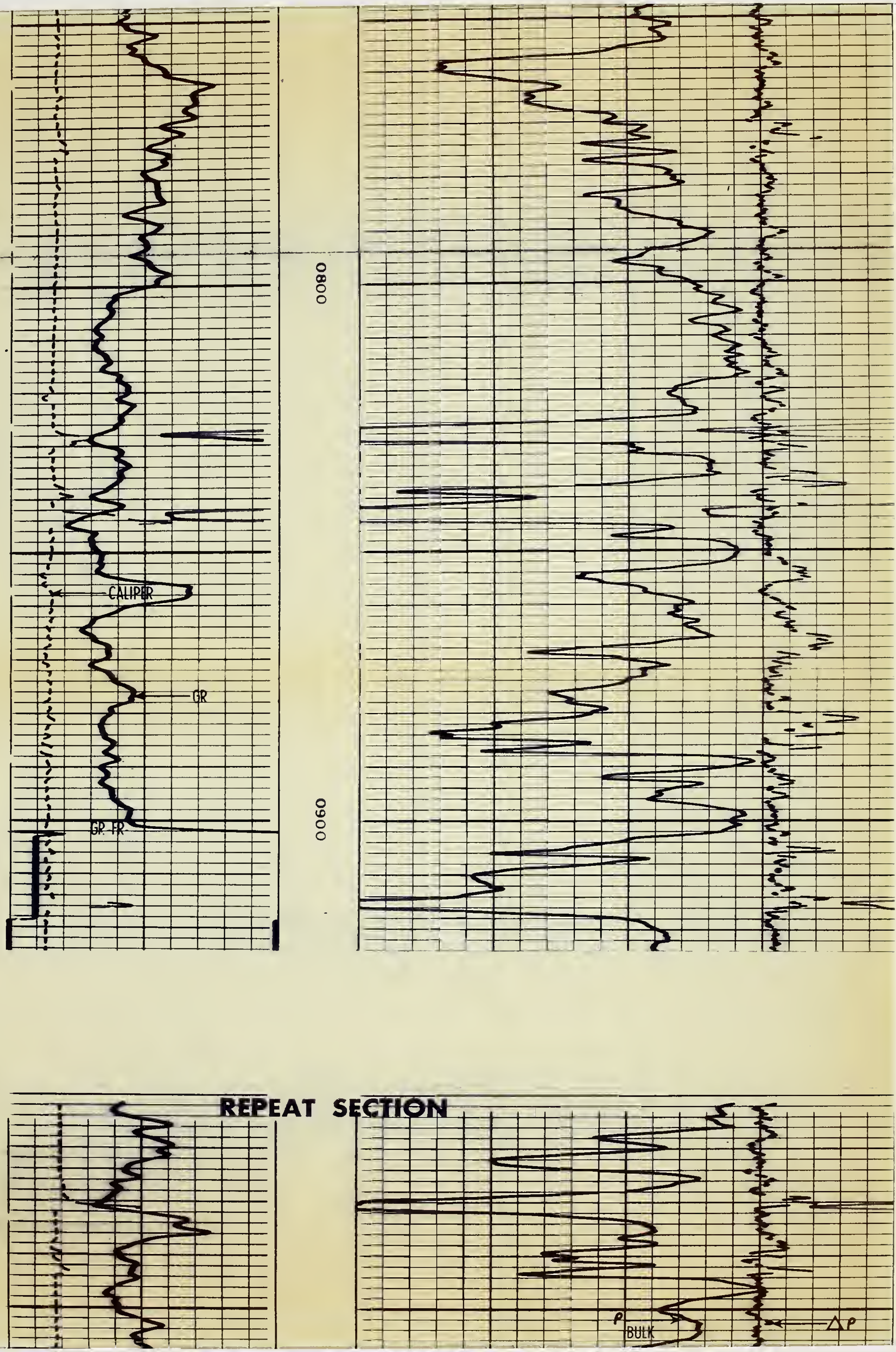
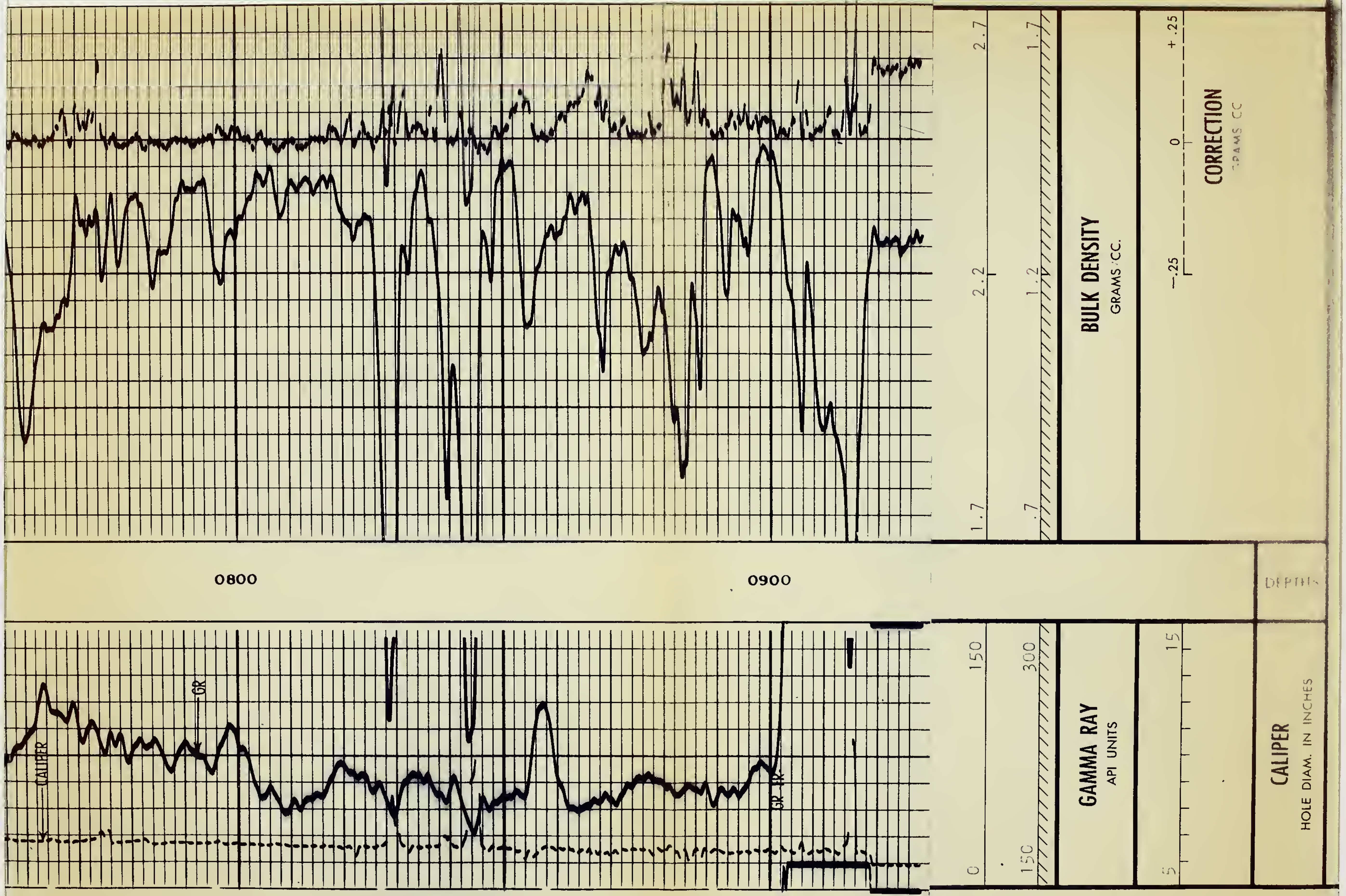
0400
050


500
0600
0700

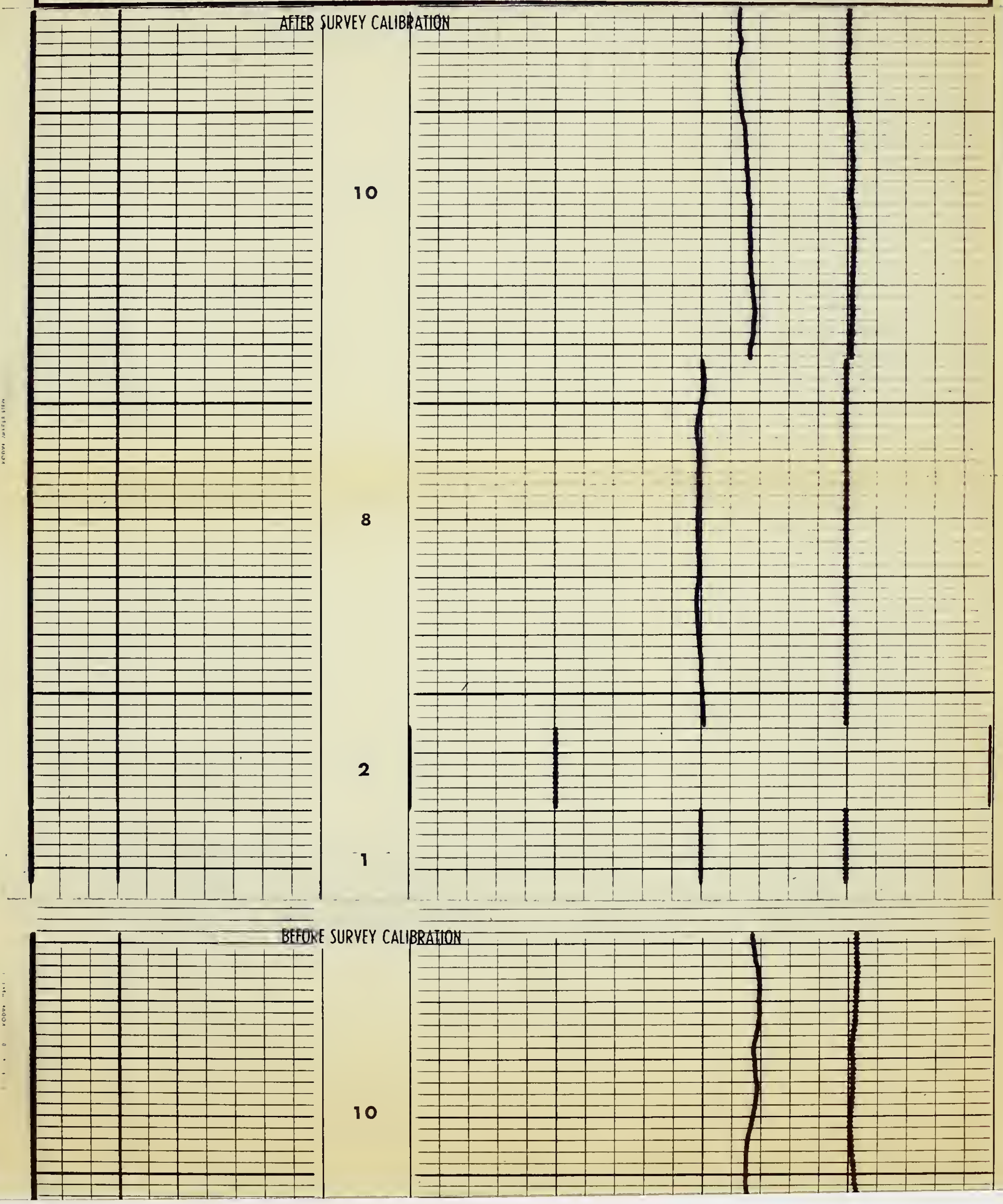

0800
0900
CALIPER
GR
GR FR
REPEAT SECTION
ρ BULK
Δρ

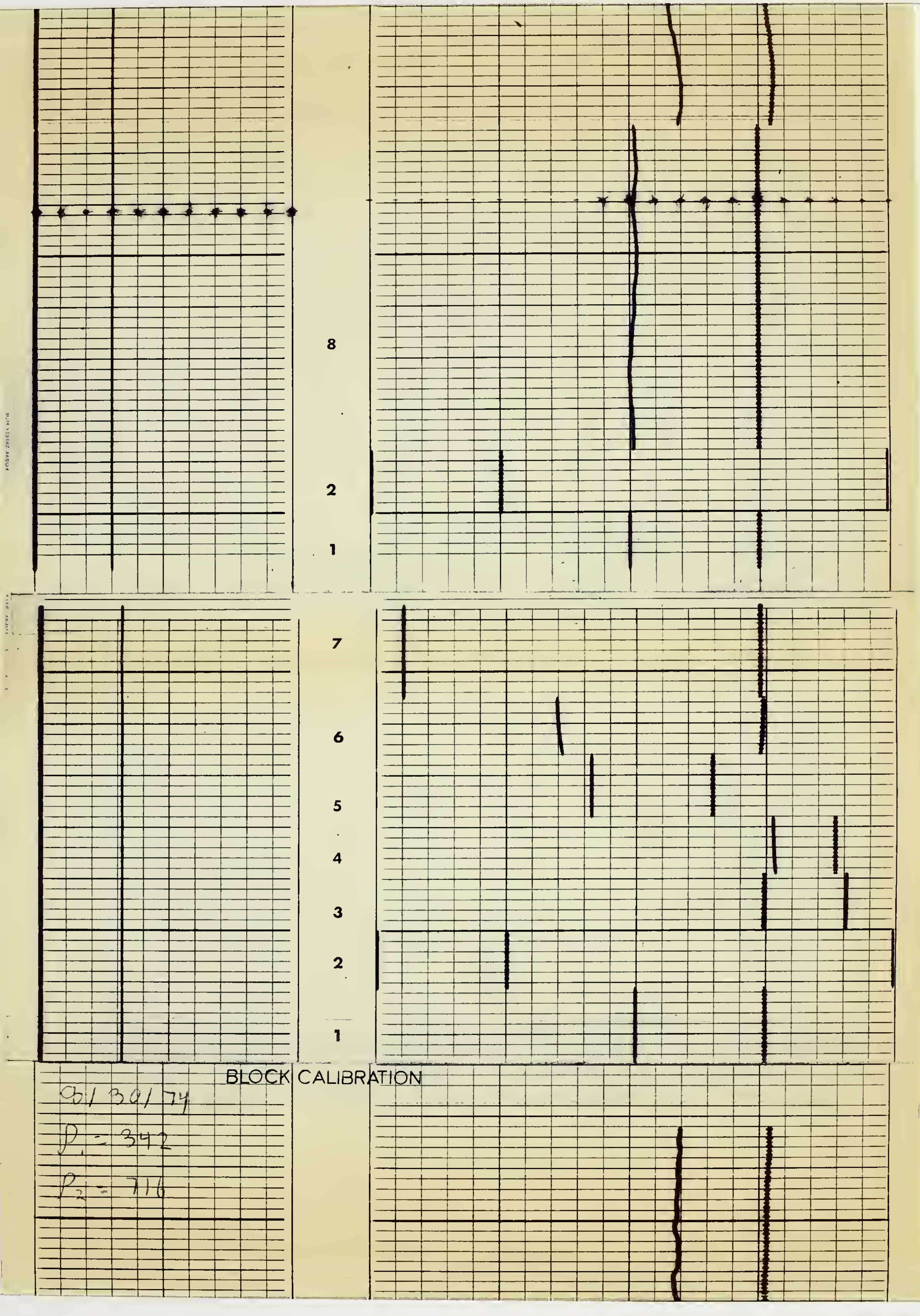


2.7
2.2
1.7
1.7
1.2
.7
BULK DENSITY
GRAMS/CC.
+.25
0
−.25
CORRECTION
GRAMS CC
0800
0900
DEPTHS
CALIPER
GR
GR FR.
150
0
300
150
GAMMA RAY
API UNITS
15
5
CALIPER
HOLE DIAM. IN INCHES

COMPANY [illegible] Rm @ °F SCHL. FR
BHT °F SCHL TD
WELL
FIELD KB
DF
COUNTY [illegible] STATE GL [illegible]370

CALIBRATION RECORD



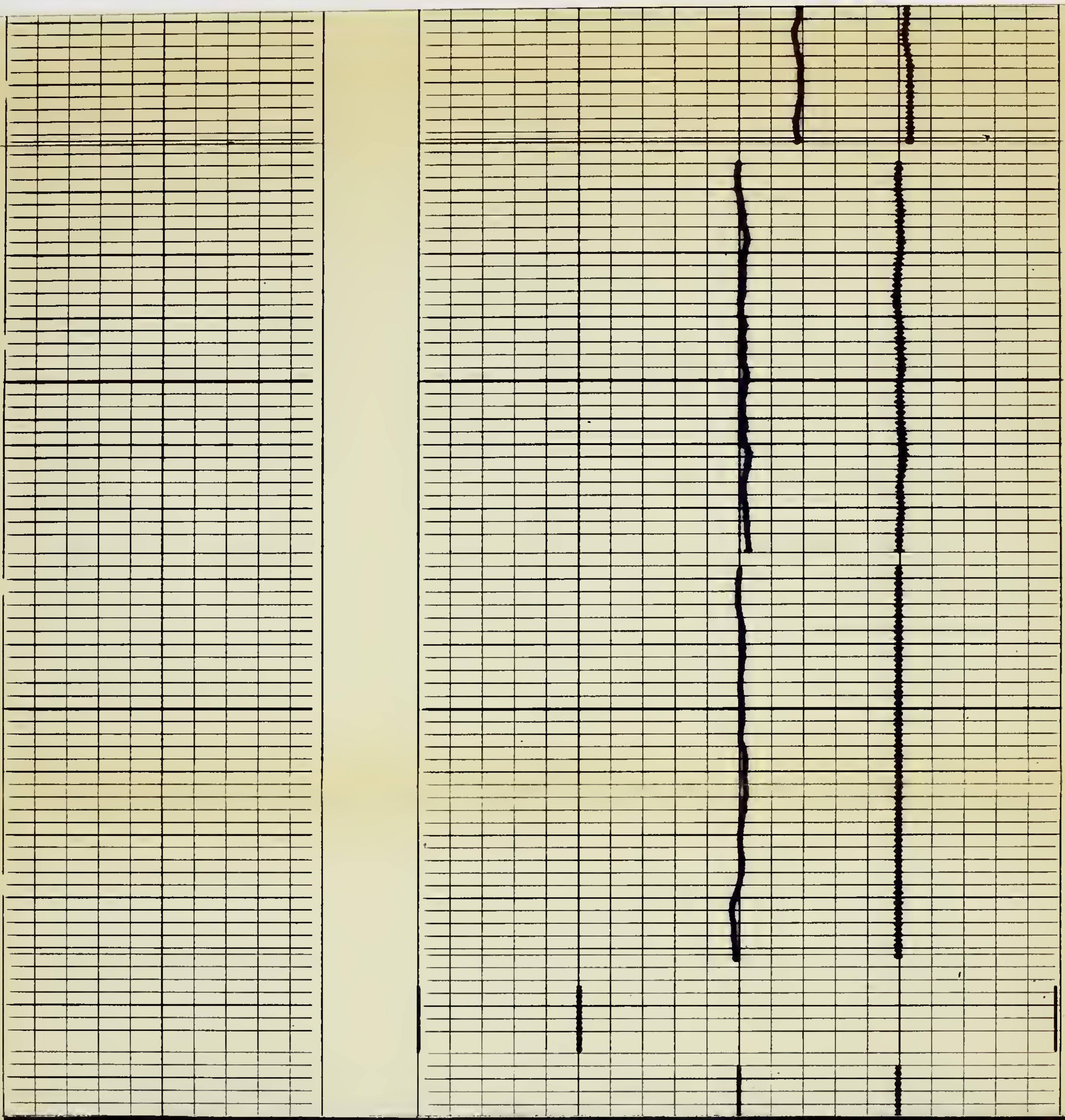


BLOCK CALIBRATION

9/30/74

$P_1 = 342$

$P_2 = 716$



CALIBRATION RECORD

COMPANY ATLANTIC RICHFIELD COMPANY
WELL SORGHUM GULCH 19
FIELD SORGHUM GULCH
COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 920
SCHL. TD 922
DRLR TD 920
Elev:
KB ----
DF ----
GL 6370

SWS-1938-B

COUNTY RIO BLANCO
FIELD or LOCATION SORGHUM GULCH
SORGHUM GULCH
WELL #19
COMPANY ATLANTIC RICHFIELD

Schlumberger

TEMPERATURE LOG

COMPANY ATLANTIC RICHFIELD

WELL SORGHUM GULCH #19

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

LOCATION
NW NW NW
Sec. 5 Twp. 3S Rge. 96W

Other Services:
HRT

Permanent Datum: G.L. ; Elev.: 6370
Log Measured From G.L. , Ft. Above Perm. Datum
Drilling Measured From G.L.

Elev.: K.B. ----
D.F. ----
G.L. 6370

Date	9/24/74		
Run No.	ONE		
Depth—Driller	922		
Depth—Logger	922		
Btm. Log Interval	921		
Top Log Interval	30		
Casing—Driller	@	@	@
Casing—Logger			
Casing Size 1	To	To	To
2	To	To	To
Casing Weight 1			
2			
Casing Thickness 1			
2			
Bit Size 1	To	To	To
2	To	To	To
Type Fluid in Hole			
Dens. | Visc.	|	|	|
Time Since Circ.			
BHT			
Equip. | Location	7683 | VERN	|	|
Recorded By	HAUGAARD		
Witnessed By	ELLARD, TAIT		

The well name, location and borehole reference data were furnished by the customer.

FOLD HERE

REMARKS: WELL WAS FLOWING WHILE LOGGING.
FILM LOGGED DOWN

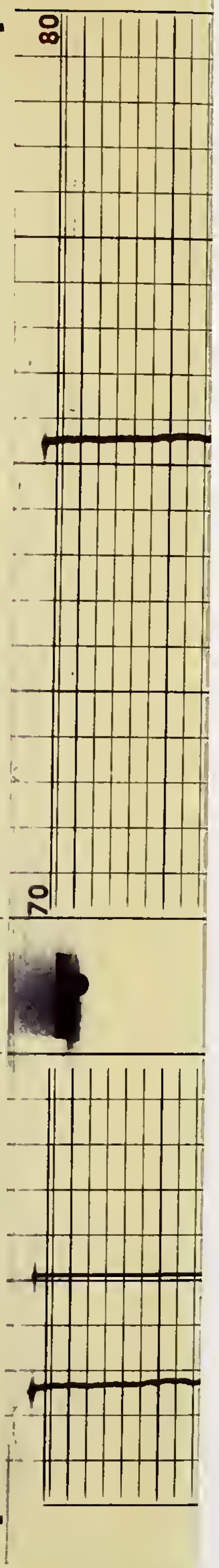
CEMENTATION DATA

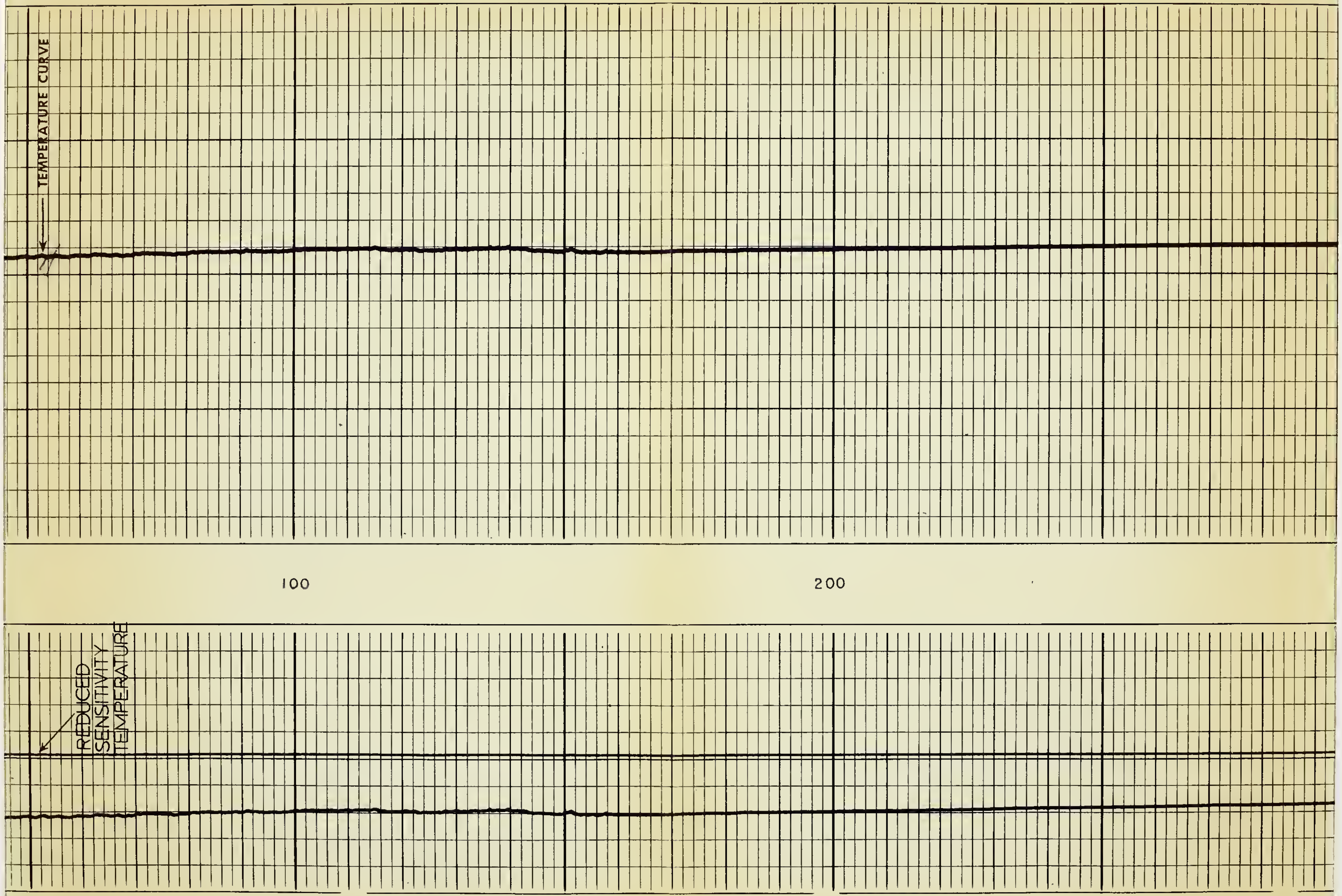
Date	Depth	Type of Cement	Nb of Sacks	Additives	Calculated Top

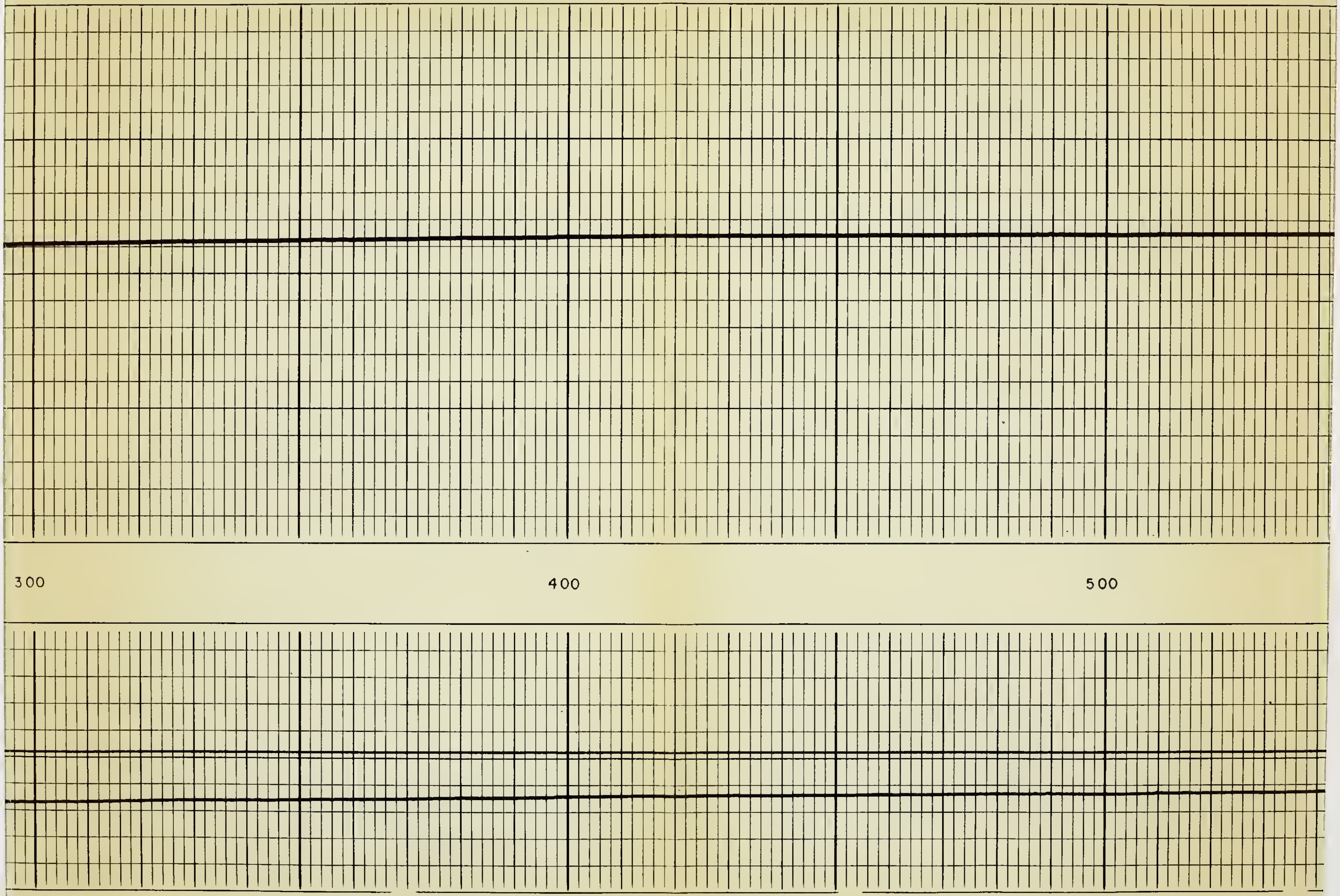
REDUCED SENSITIVITY TEMPERATURE

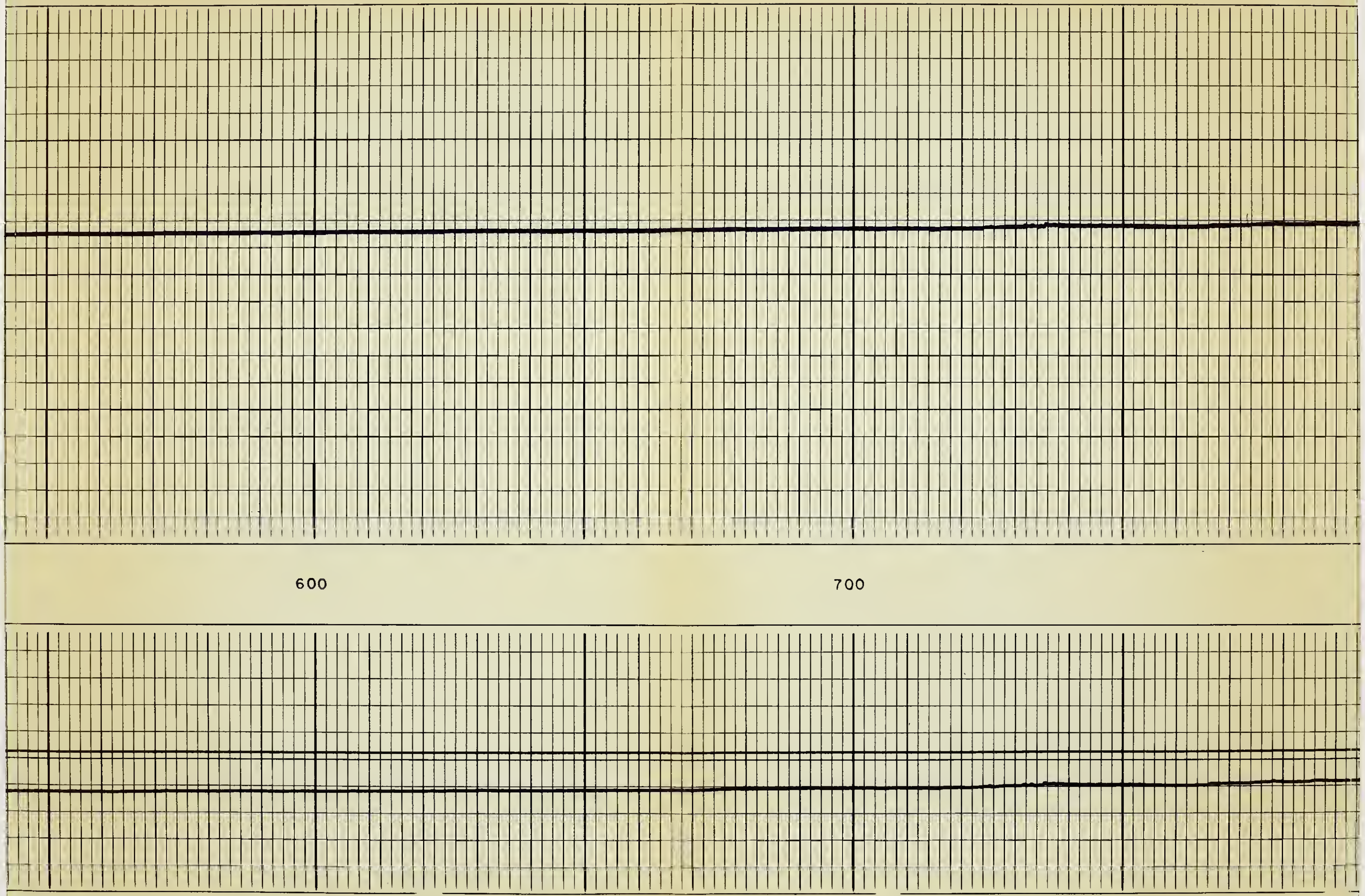
TEMPERATURE °F.

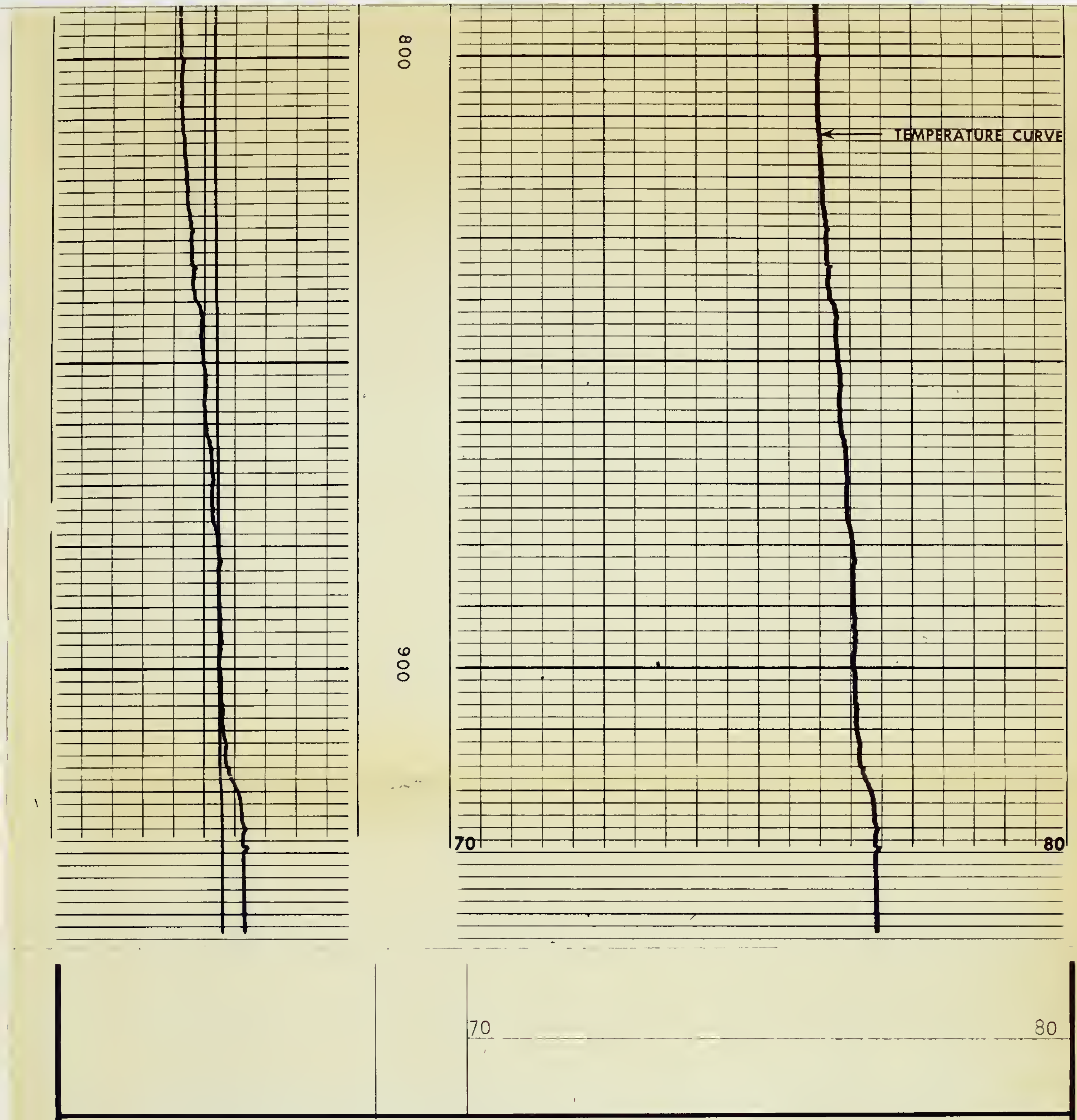
70 80




TEMPERATURE CURVE
100
200
REDUCED SENSITIVITY TEMPERATURE


300
400
500


600
700



TEMPERATURE °F.

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #19

FIELD SORGHUM GULCH

COUNTY RIO BLANCO

STATE COLORADO

SCHL. F. R. 921

SCHL. T. D. 922

DRLR. T. D. 920

EXISTING COREHOLE Cb-1

THIS ENVELOPE CONTAINS THE FOLLOWING GEOPHYSICAL LOG:

Birdwell: Temperature

II B-370

Birdwell

Temperature Log

FILING NO.

COMPANY ATLANTIC RICHFIELD COMPANY, ET. AL.

WELL TOSCO CB-1

FIELD

COUNTY RIO BLANCO **STATE** COLORADO

LOCATION: NE SW SW

SEC. 1 TWP. 3S RGE. 97W

OTHER SERVICES:

ELEVATIONS:
KB.
DF.
GL. 6760'

PERMANENT DATUM GROUND LEVEL ELEV. 6760'
LOG MEASURED FROM GL
DRILLING MEASURED FROM GL

DATE	29 JUNE 74		
RUN NO.			
TYPE LOG			
DEPTH—DRILLER			
DEPTH—LOGGER	2005		
BOTTOM LOGGED INTERVAL	2005		
TOP LOGGED INTERVAL	370		
TYPE FLUID IN HOLE	WATER		
SALINITY PPM CL.			
DENSITY LB./GAL.			
LEVEL	357		
MAX. REC. TEMP.—DEG. F.	97.5°		
OPR. RIG TIME	1 HR.		
RECORDED BY	WILSON		
WITNESSED BY	TAIT		
LOCATION	LAS VEGAS		

RUN NO.	BORE HOLE RECORD			CASING RECORD			
	BIT	FROM	TO	SIZE	WGT.	FROM	TO

SSC-608-B

WELL DATA

TYPE WELL			
RUN NO.			
PROD. OR INJ. RATE			
WELL HEAD PRESSURE			
TYPE & AMT. CEMENT			
LENGTH OF TIME:			
PROD. OR INJECTING			
SHUT IN			
SINCE CEMENTING			
PURPOSE OF SURVEY			

EQUIPMENT DATA

TYPE LOG	TL		
RUN NO.	1		
TOOL MODEL NO.	LDAH-6010		
DIAM.	1-5/8"		
SPEED FT./MIN.	60		
T. C. - SEC.	1		
SCALE	1/4°/DIV.		

GENERAL

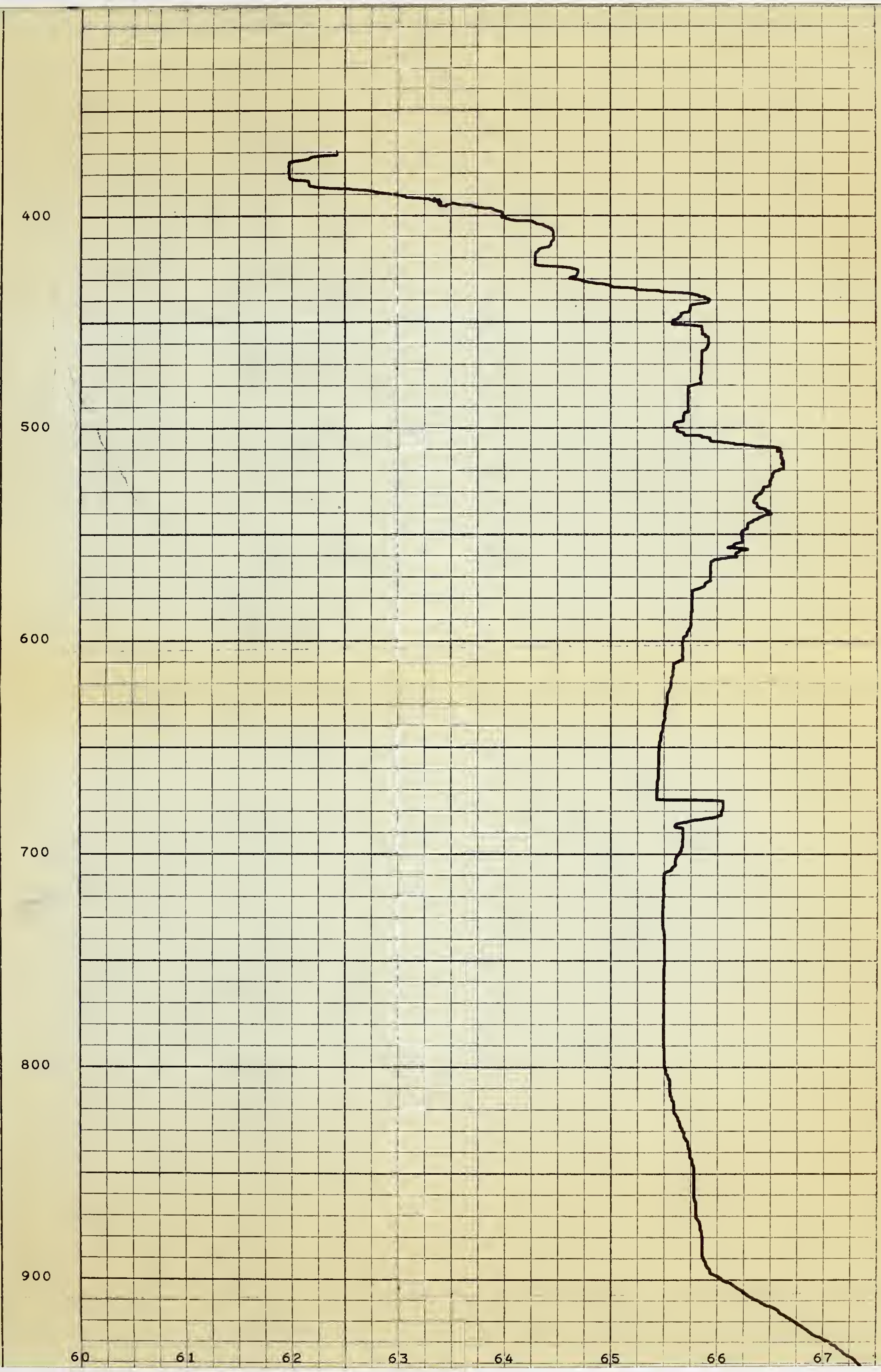
HOIST TRUCK NO.	2694		
INST. TRUCK NO.	2694		
TOOL SERIAL NO.			

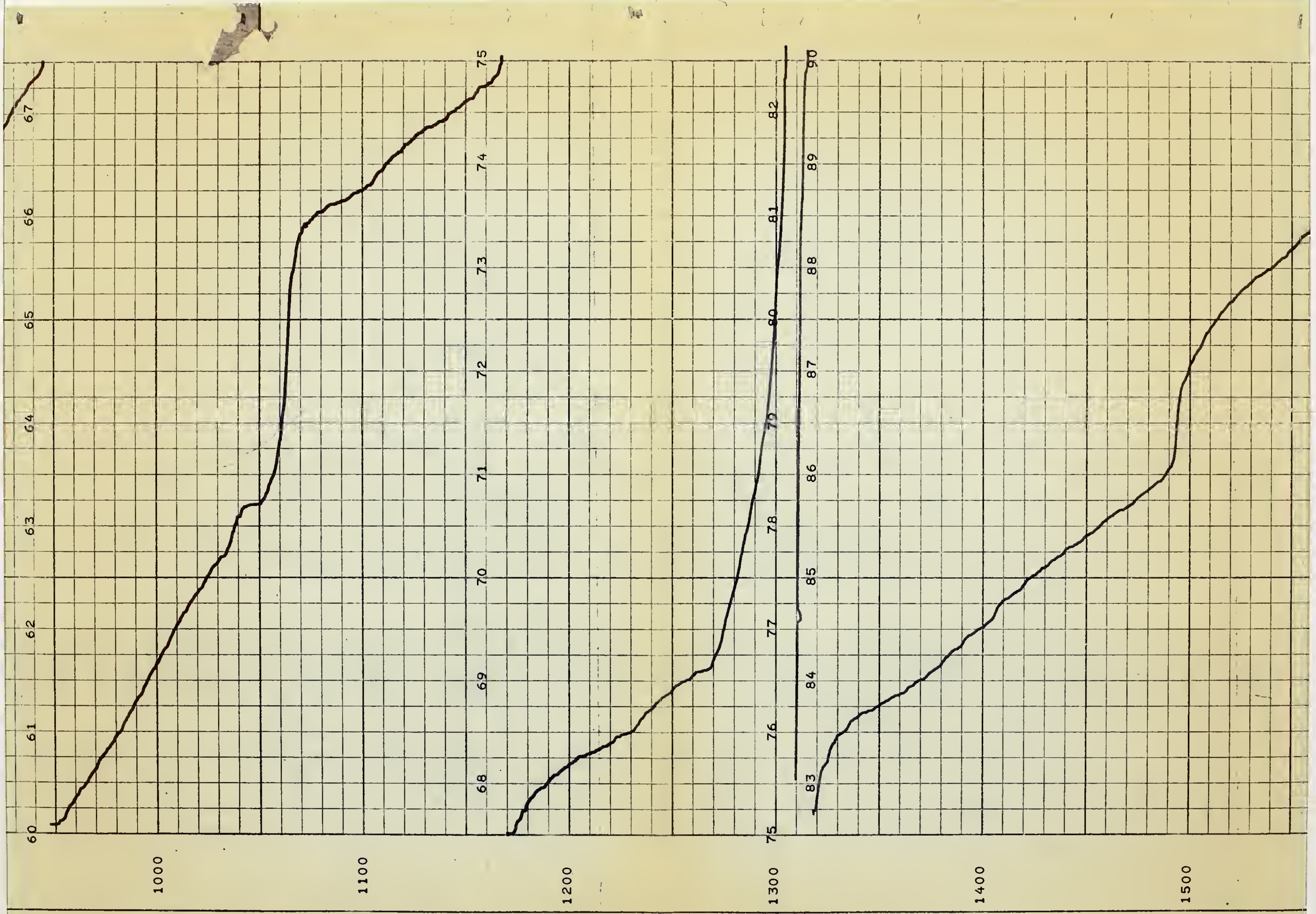
REMARKS: N.A. Means not available

TEMPERATURE DEGREES FAHRENHEIT

53 54 55 56 57 58 59 60

DEPTH


400
500
600
700
800
900
60
61
62
63
64
65
66
67


60
61
62
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72
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75
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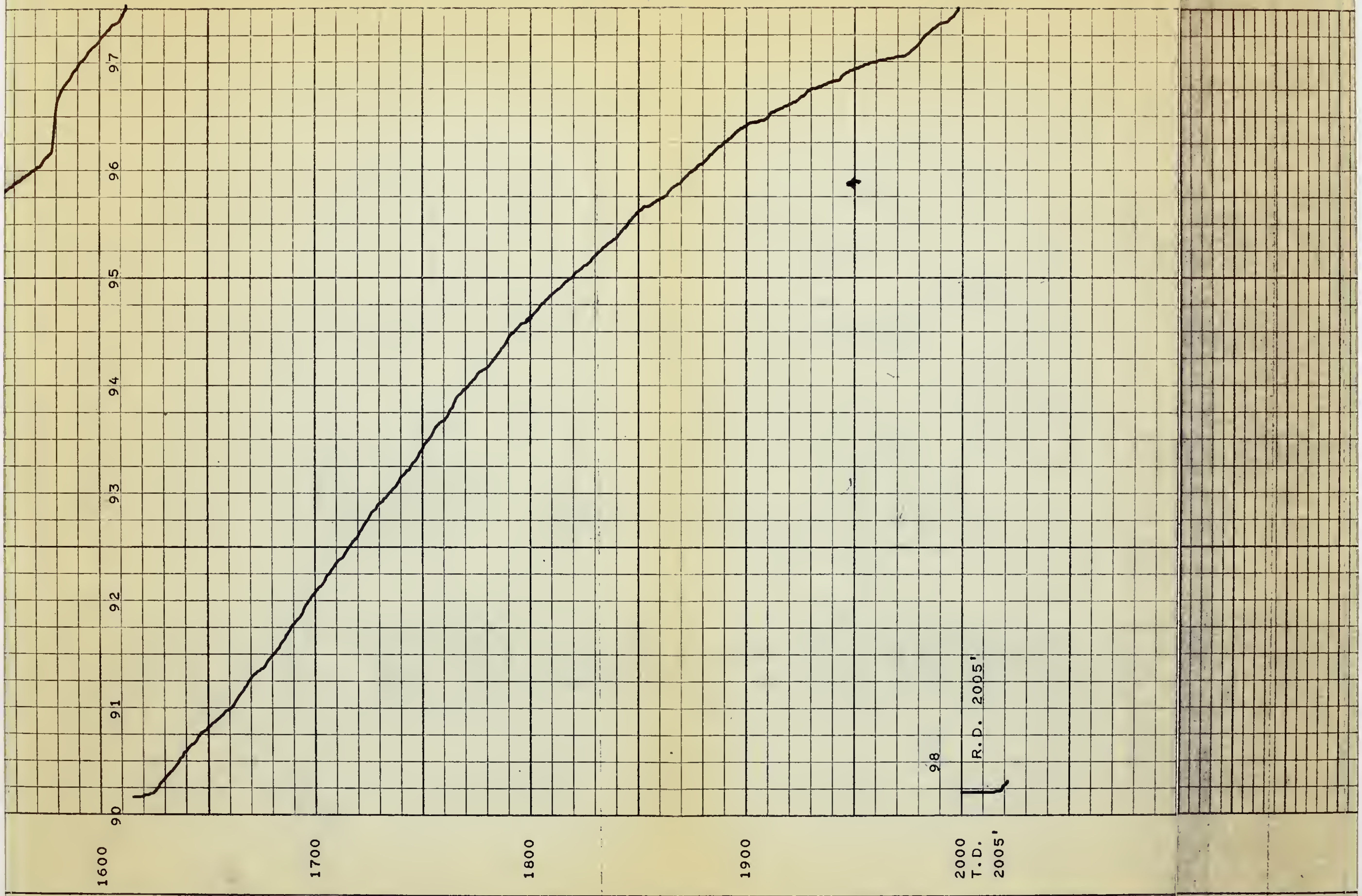
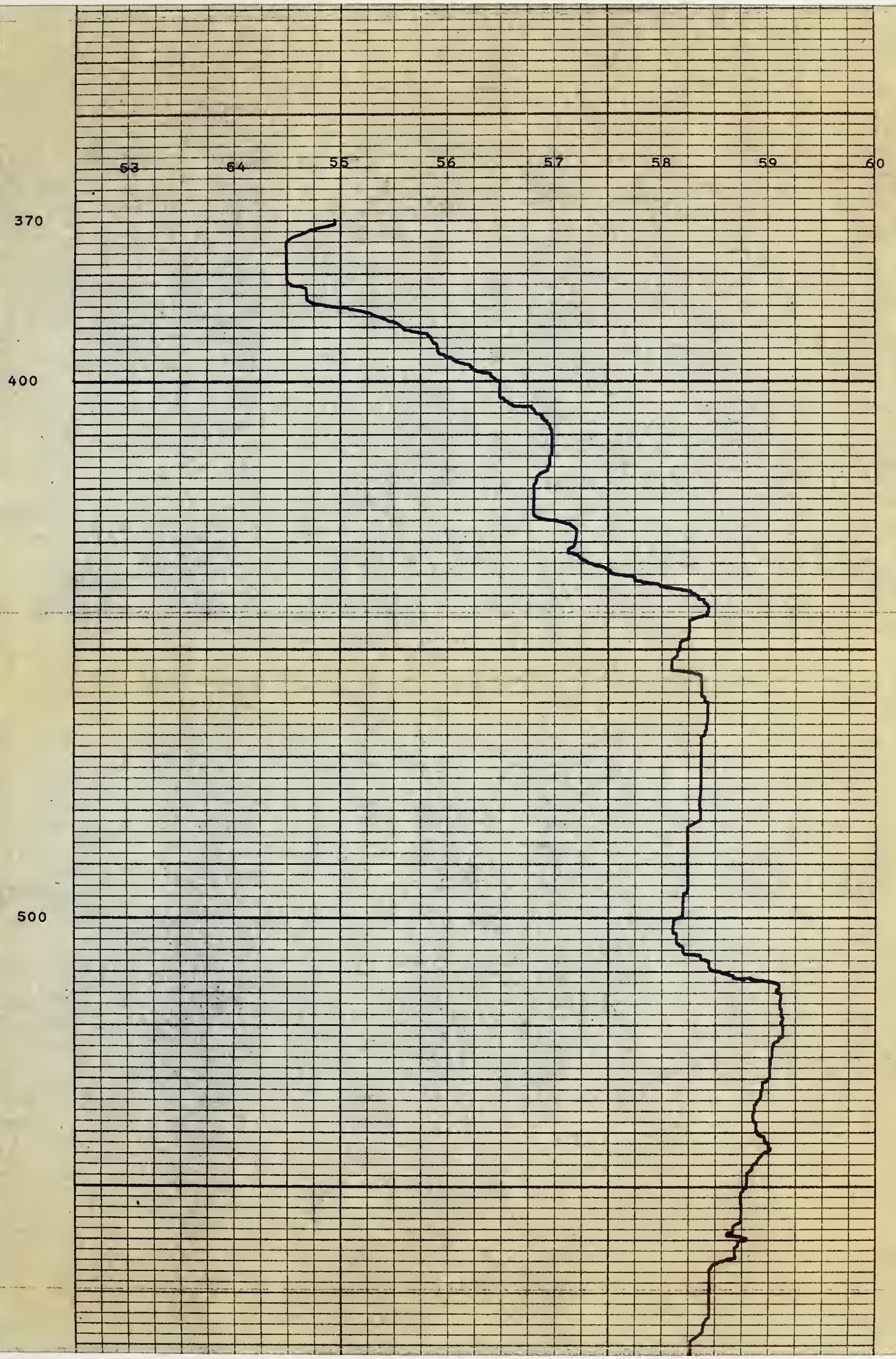
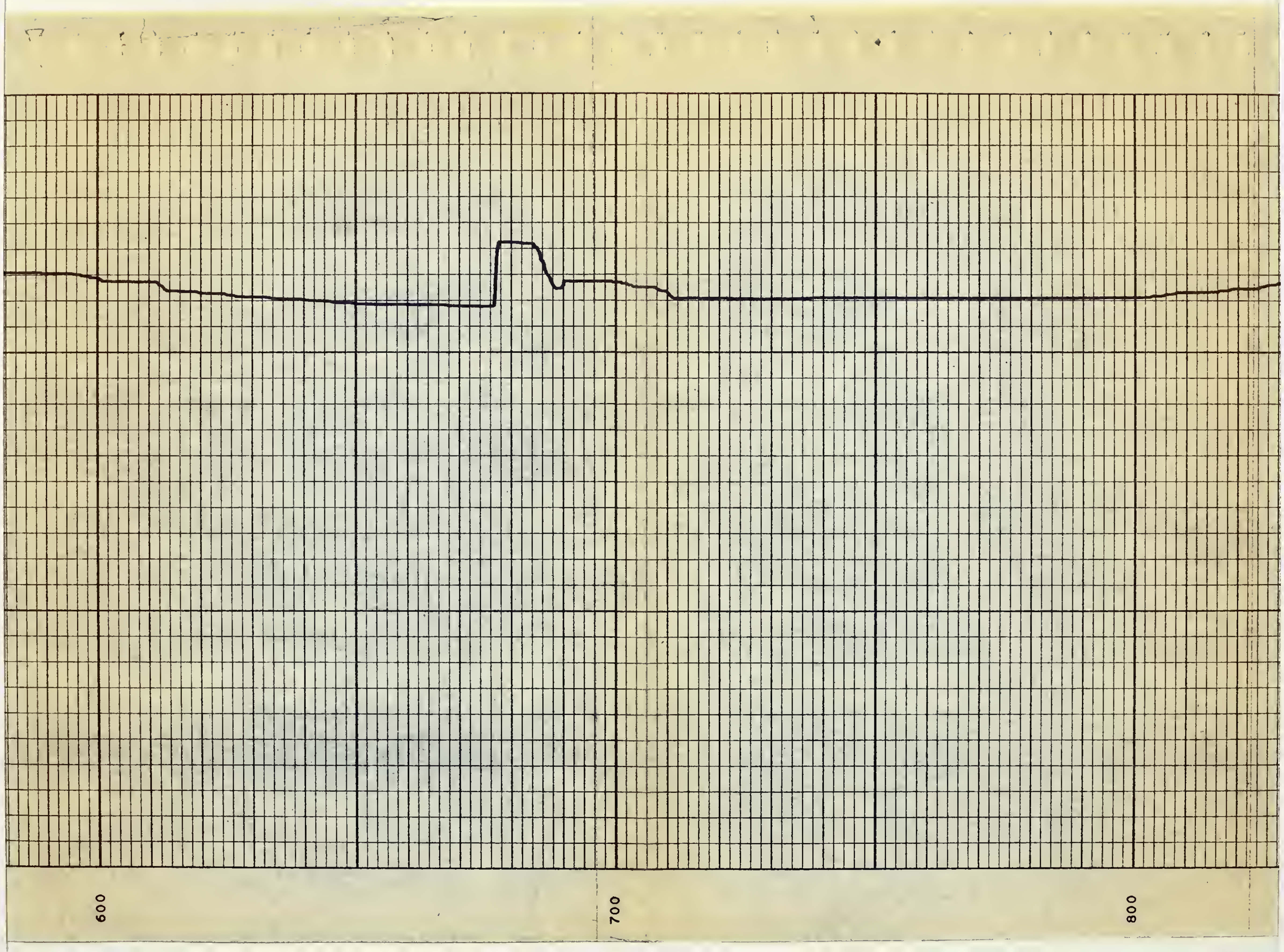
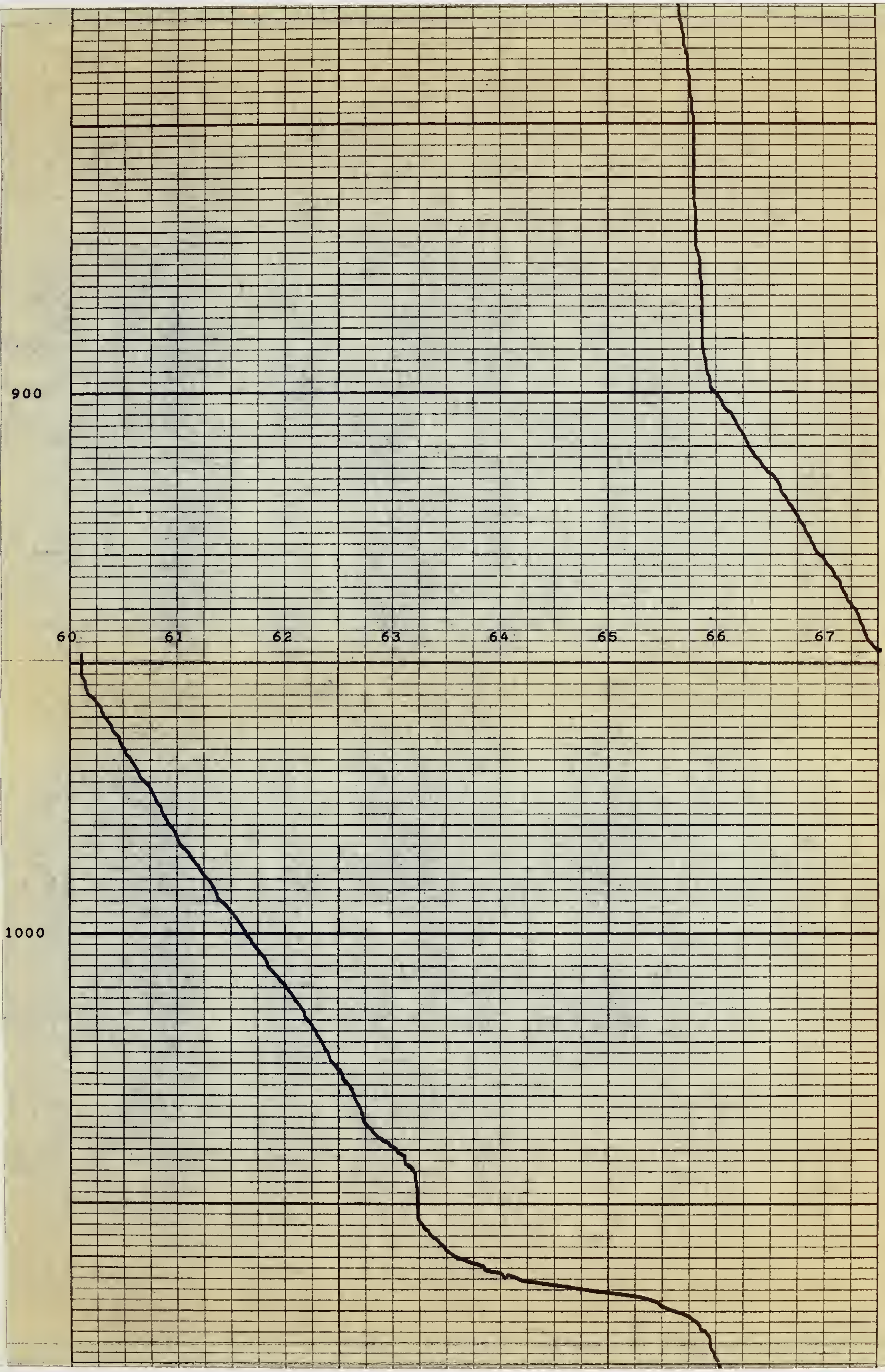
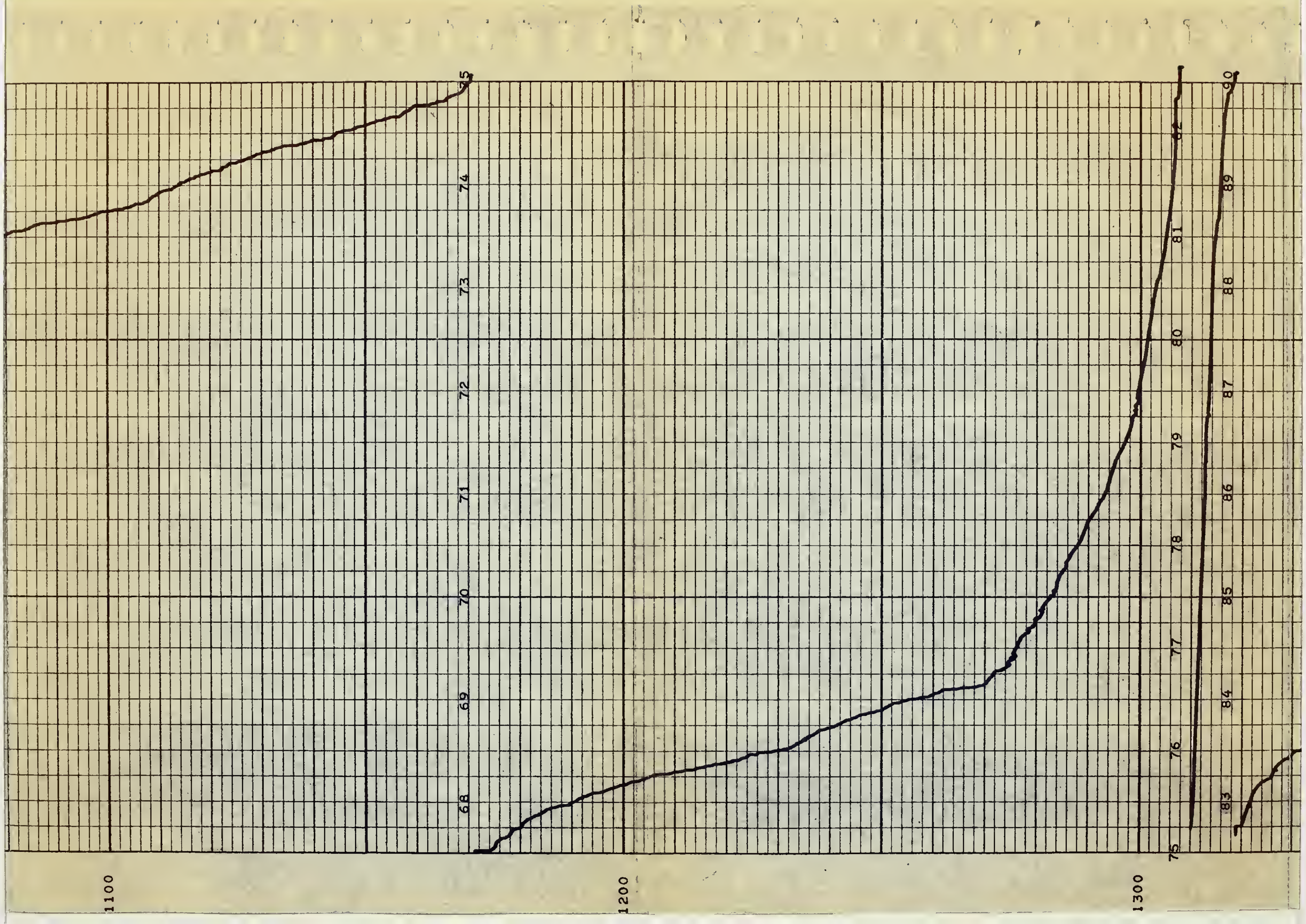
1000
1100
1200
1300
1400
1500


90
91
92
93
94
95
96
97
98
R.D. 2005'
1600
1700
1800
1900
2000
T.D.
2005'


53
54
55
56
57
58
59
60
370
400
500


600
700
800


60
61
62
63
64
65
66
67
900
1000


1100
1200
1300
68
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70
71
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84
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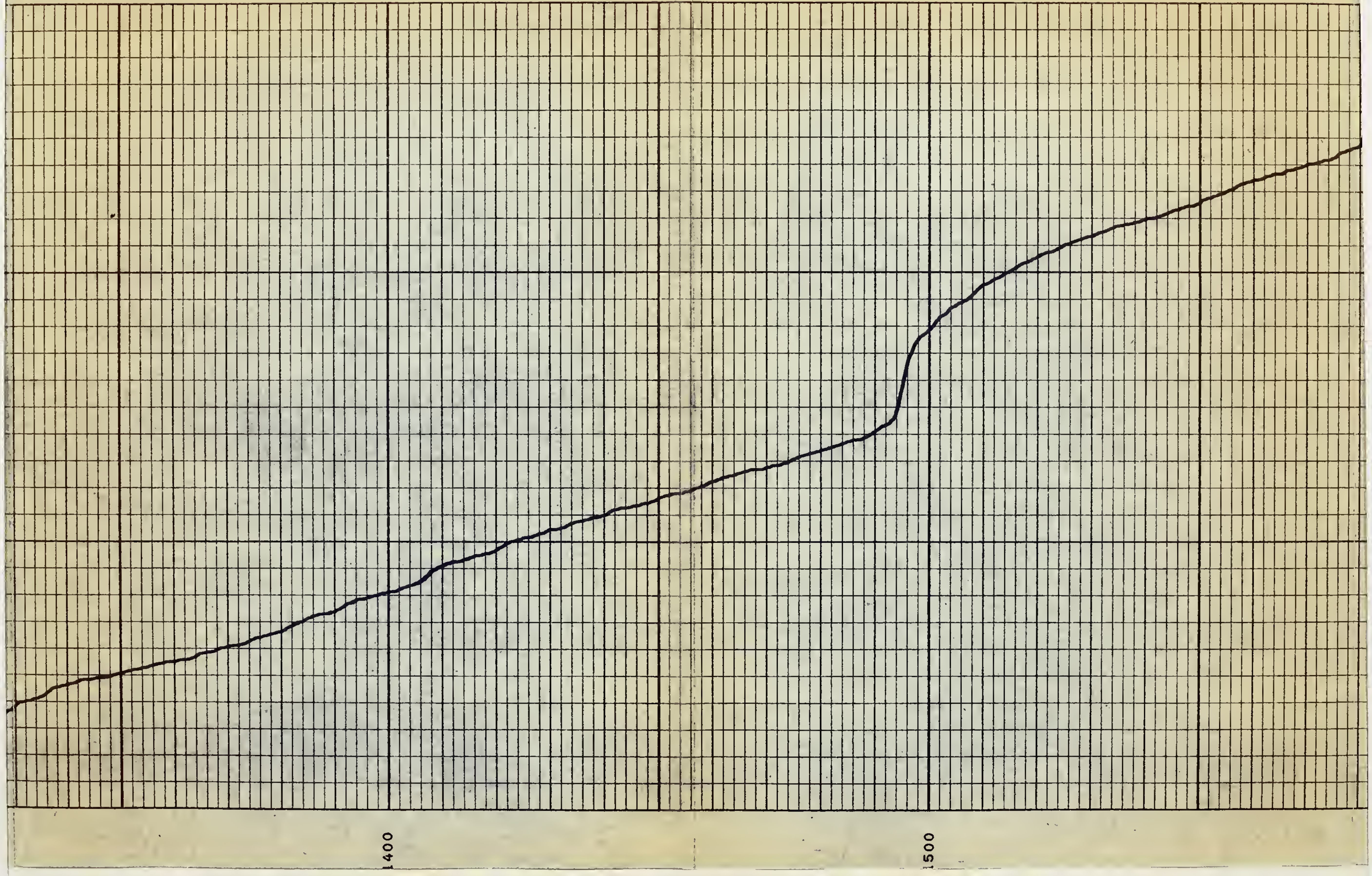
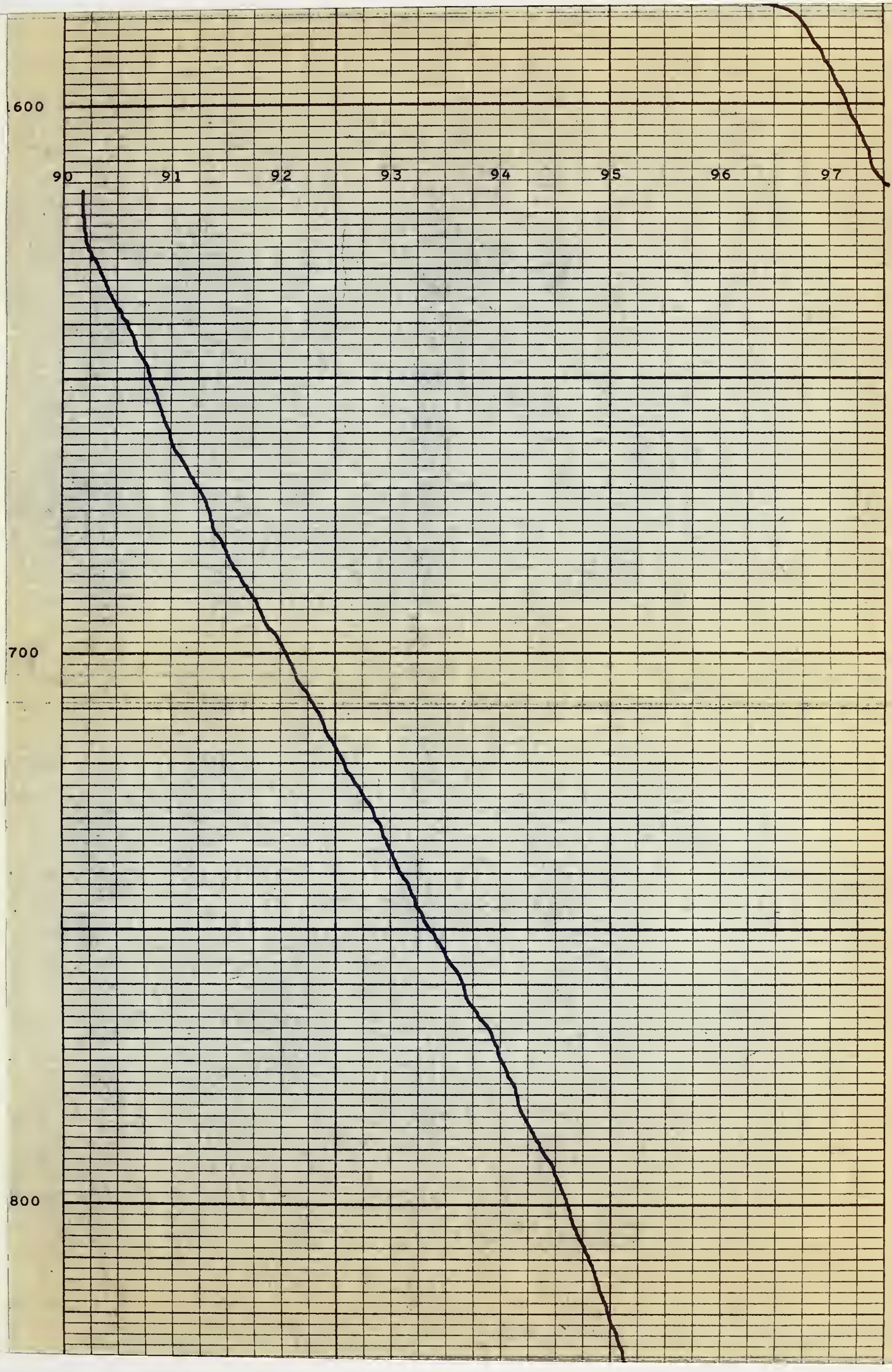
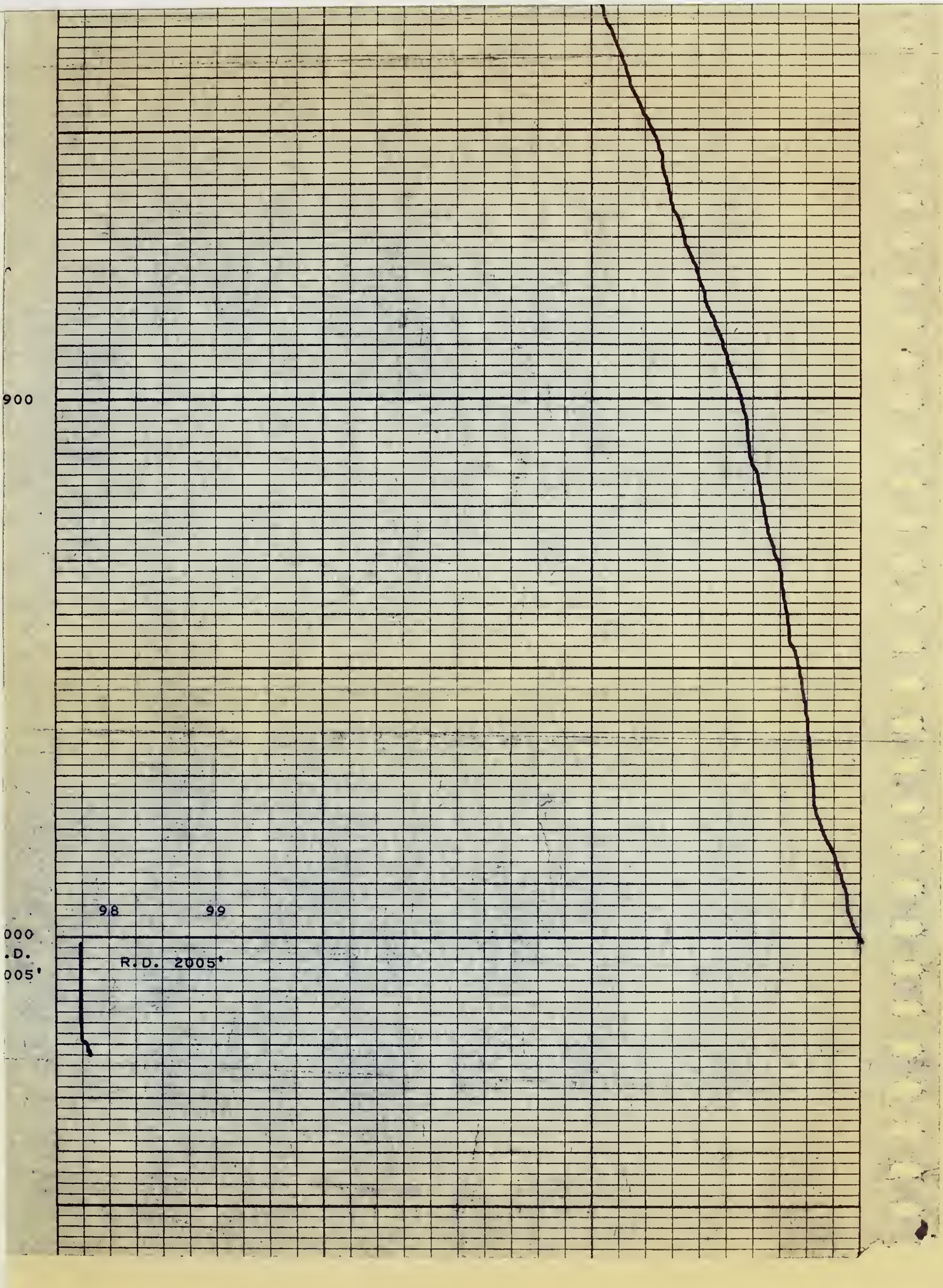
88
89
90


1400
1500


600
700
800
90
91
92
93
94
95
96
97


900
98
99
000
.D.
005'
R.D. 2005'

EXISTING COREHOLE Cb-2

THIS ENVELOPE CONTAINS THE FOLLOWING GEOPHYSICAL LOG:

Birdwell: Temperature

II B-371

Birdwell

Temperature Log

ILING NO.

COMPANY ATLANTIC RICHFIELD COMPANY, ET. AL.

WELL TOSCO CB-2

FIELD

COUNTY RIO BLANCO STATE COLORADO

LOCATION: SW NE SE

SEC. 6 TWP. 3S RGE. 96W

OTHER SERVICES:

ELEVATIONS:
KB.
DF.
GL. 6737'

PERMANENT DATUM GROUND LEVEL ELEV. 6737'
LOG MEASURED FROM GL
DRILLING MEASURED FROM GL

DATE	4 JULY 74		
RUN NO.	1		
TYPE LOG	TL		
DEPTH—DRILLER			
DEPTH—LOGGER	1405		
BOTTOM LOGGED INTERVAL	1405		
TOP LOGGED INTERVAL	290		
TYPE FLUID IN HOLE	WATER		
SALINITY PPM CL.			
DENSITY LB./GAL.			
LEVEL	282		
MAX. REC. TEMP.—DEG. F.	70.5°		
OPR. RIG TIME	1 HR.		
RECORDED BY	WILSON		
WITNESSED BY	TAIT		
LOCATION	LAS VEGAS		

RUN NO.	BORE HOLE RECORD			CASING RECORD			
	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1							

SSC-609-B

WELL DATA

TYPE WELL	
RUN NO.	
PROD. OR INJ. RATE	
WELL HEAD PRESSURE	
TYPE & AMT. CEMENT	
LENGTH OF TIME:	
PROD. OR INJECTING	
SHUT IN	
SINCE CEMENTING	
PURPOSE OF SURVEY	

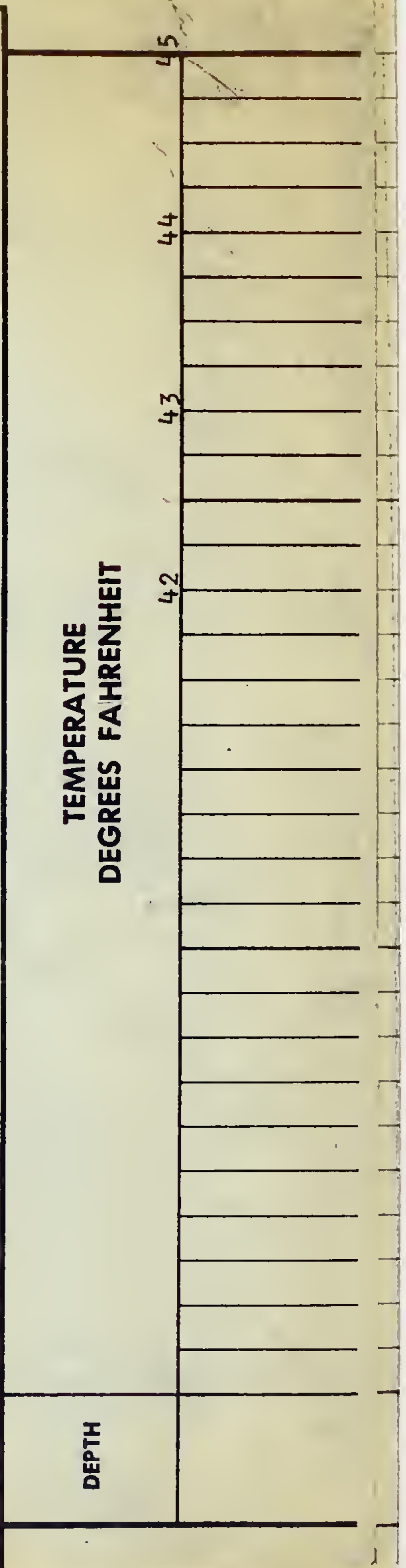
EQUIPMENT DATA

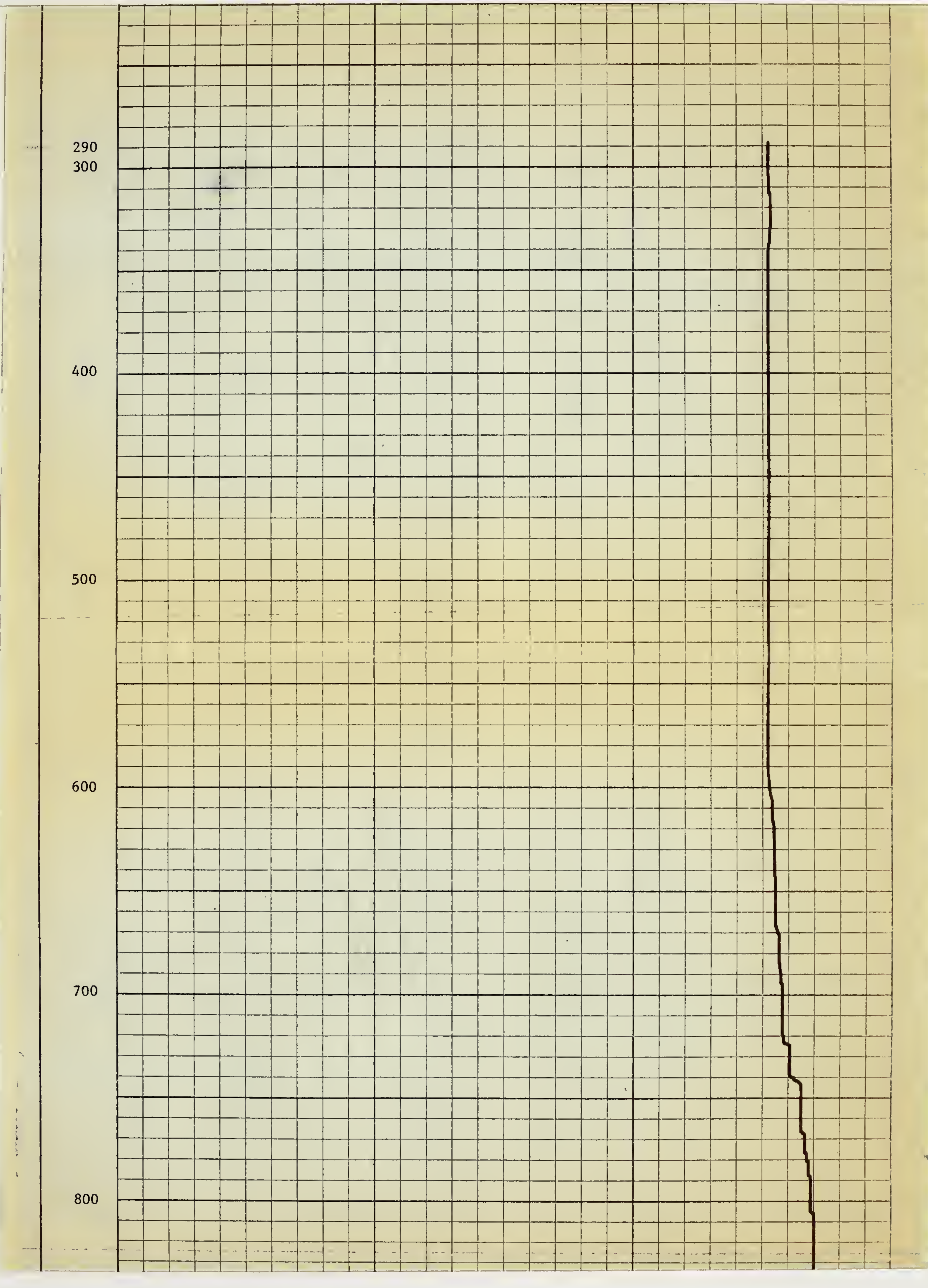
TYPE LOG	TL		
RUN NO.	1		
TOOL MODEL NO.	LDAH-6010		
DIAM.	3-5/8"		
SPEED FT./MIN.	60		
T.C. - SEC.	1		
SCALE	1/4°/DIV.		

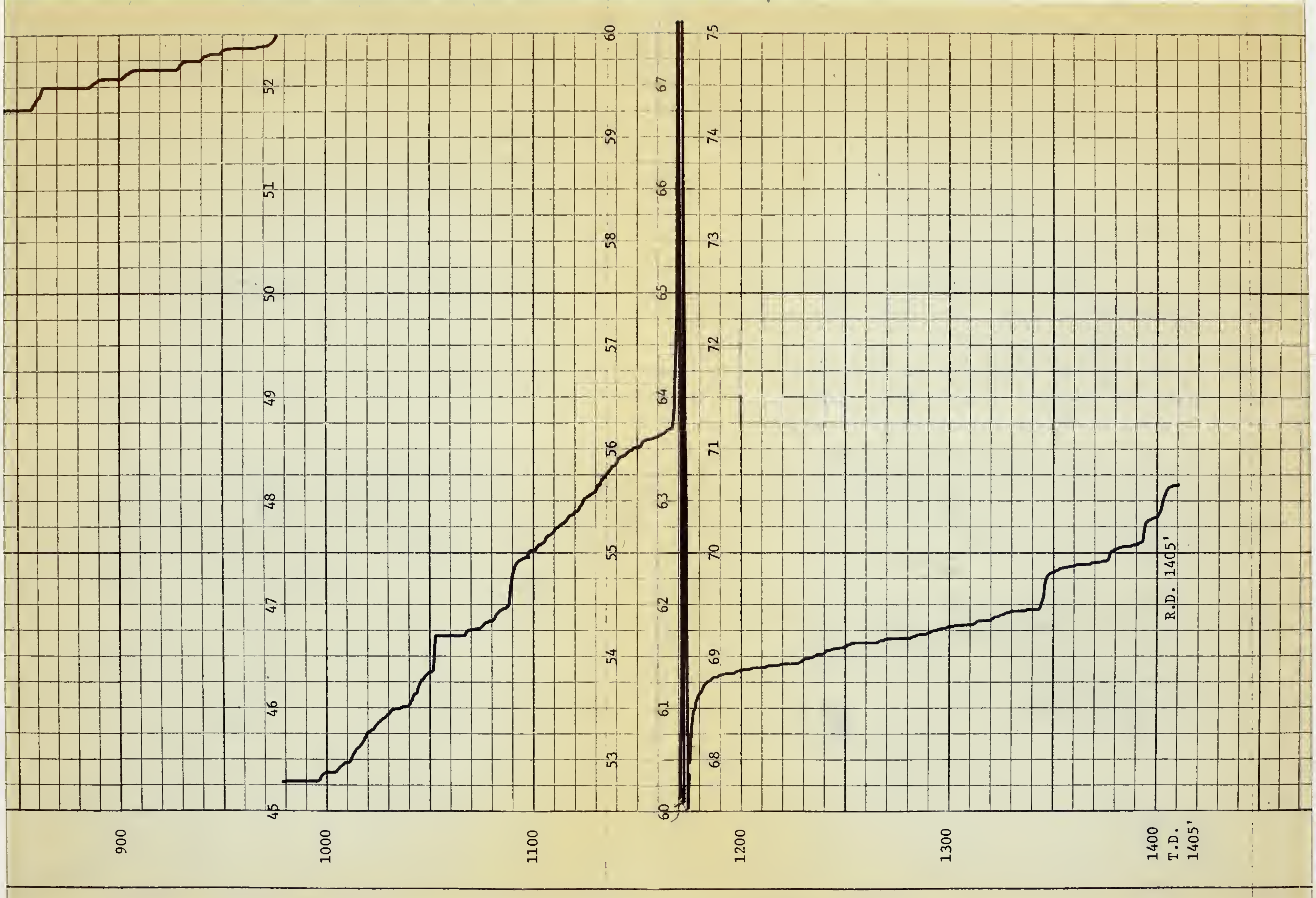
GENERAL

HOIST TRUCK NO.	2694		
INST. TRUCK NO.	2694		
TOOL SERIAL NO.			

REMARKS: N.A. Means not available




290
300
400
500
600
700
800


45
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69
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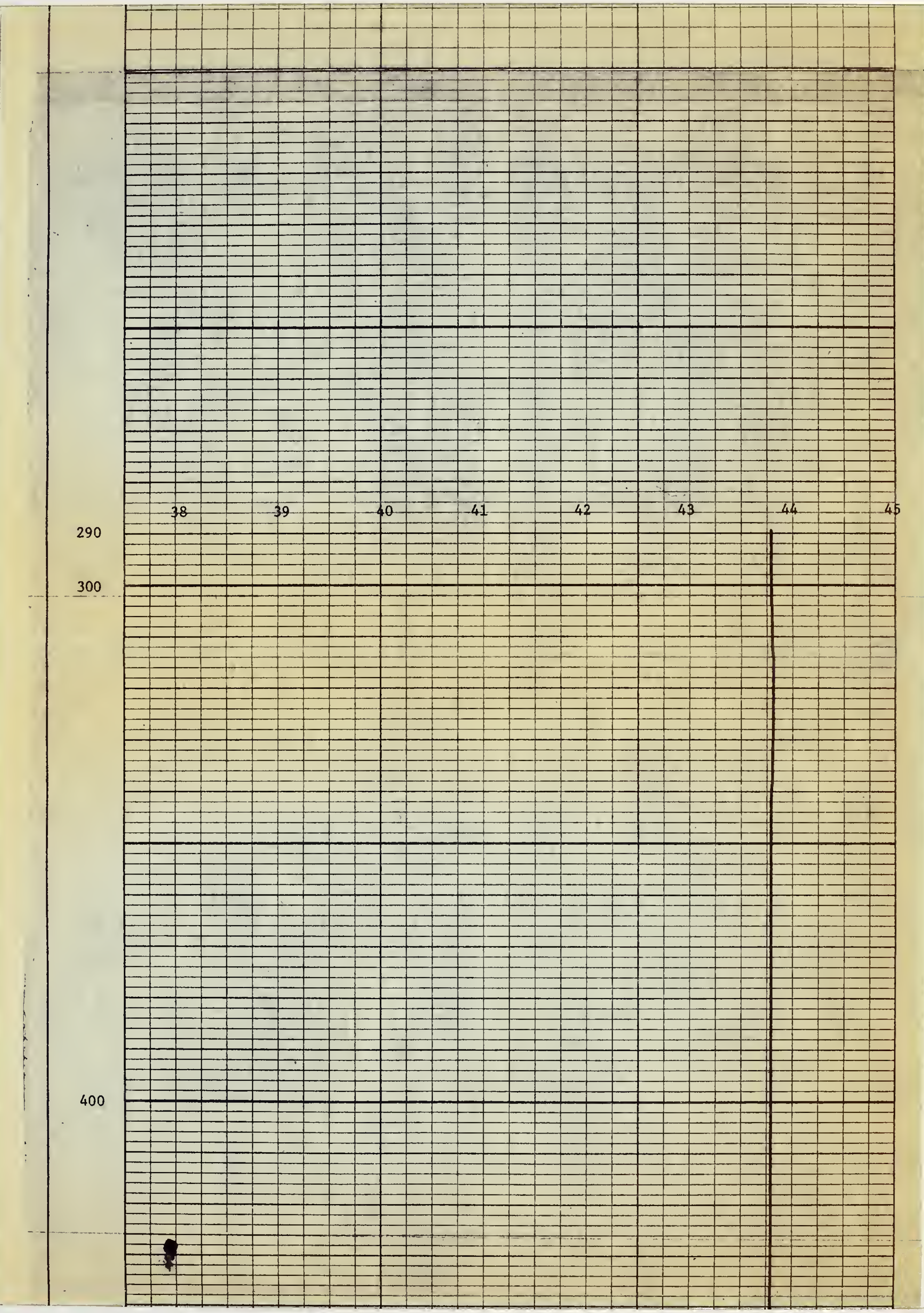
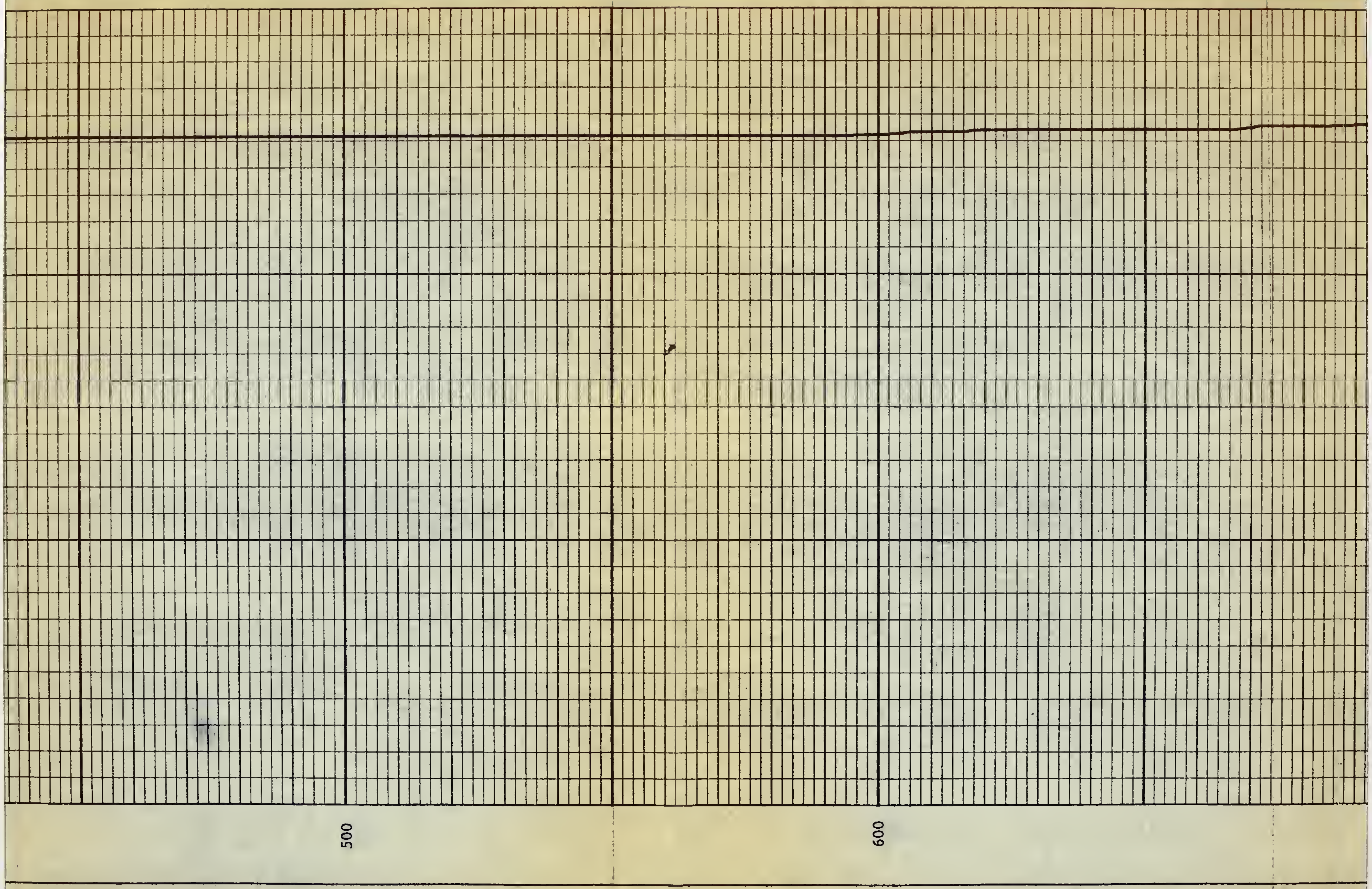
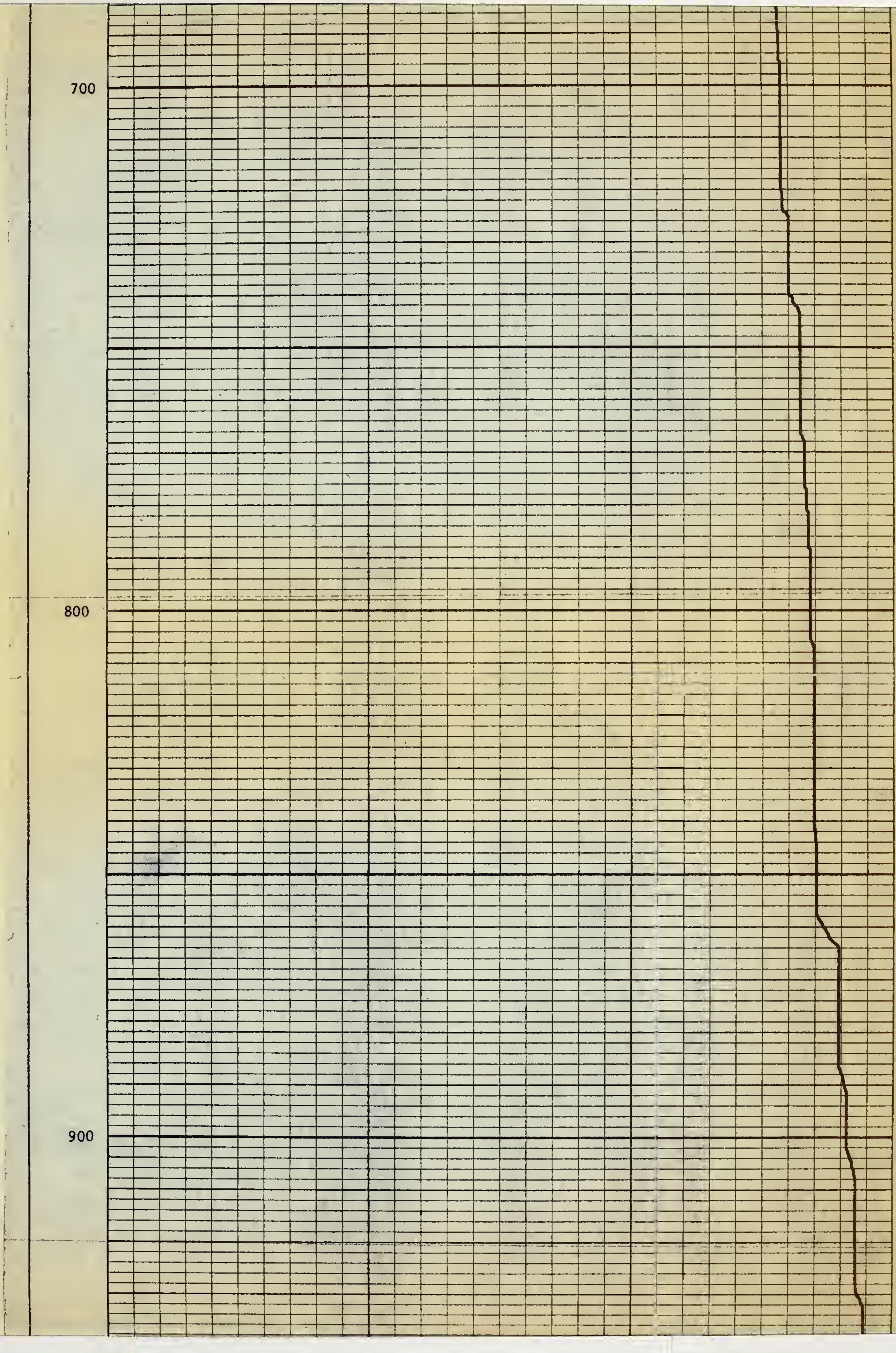
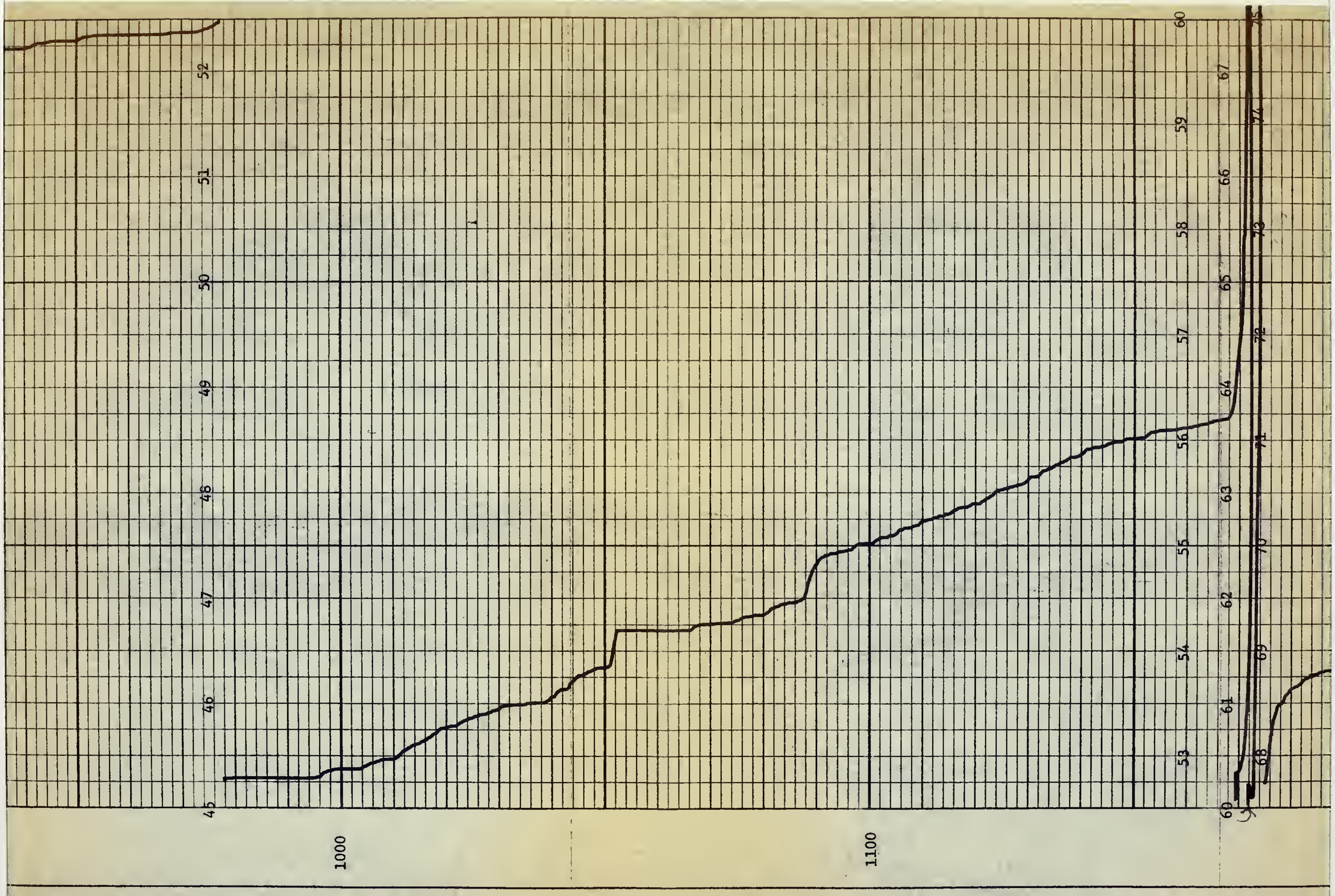
71
72
73
74
75
900
1000
1100
1200
1300
1400
T.D.
1405'
R.D. 1405'


38
39
40
41
42
43
44
45
290
300
400


500
600



700
800
900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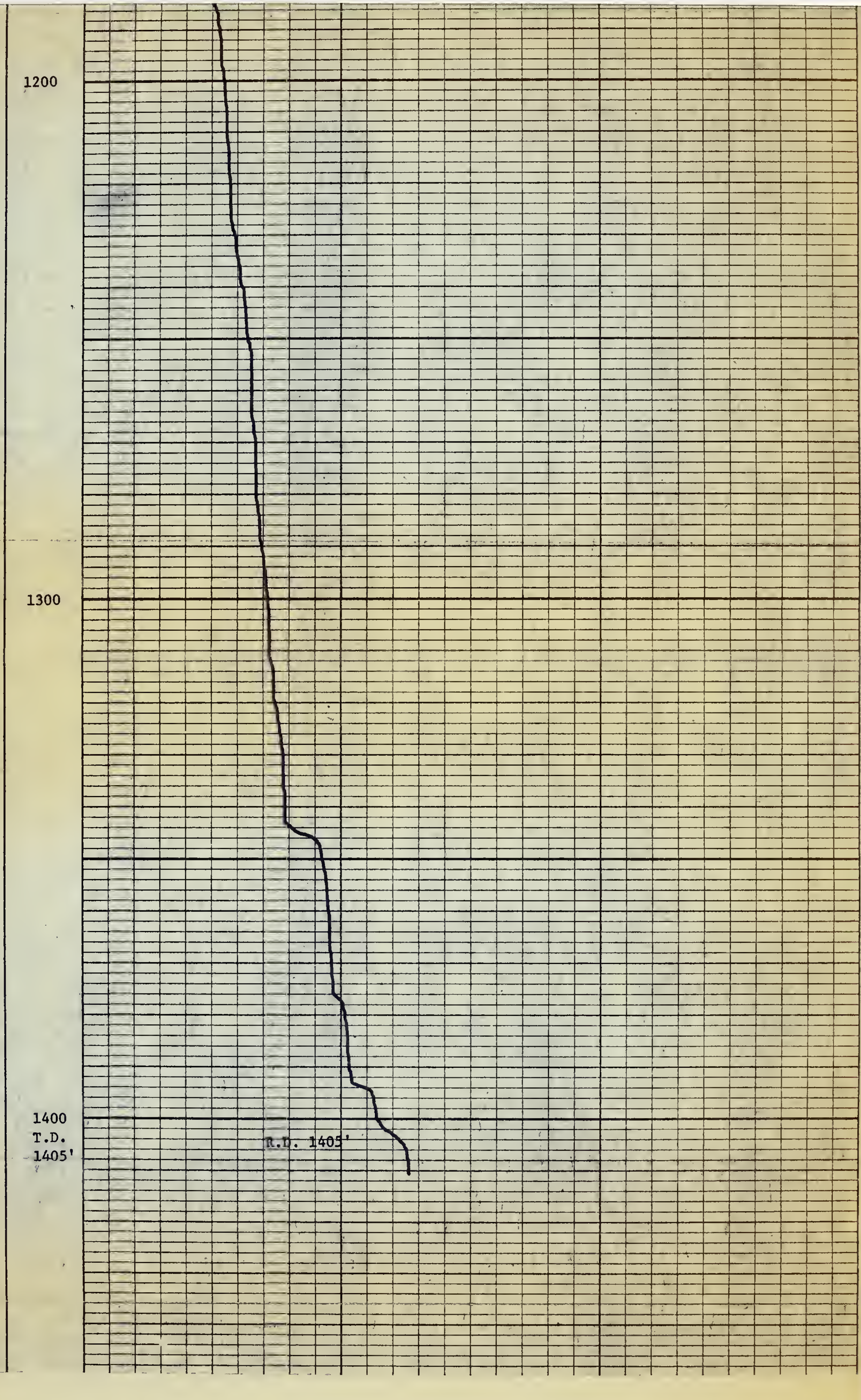
71
72
73
74
75
1000
1100


1200
1300
1400
T.D.
1405'
R.D. 1405'

EXISTING COREHOLE Cb-3

THIS ENVELOPE CONTAINS THE FOLLOWING GEOPHYSICAL LOG:

Birdwell: Temperature

II B-372

Birdwell

Temperature Log

FILING NO.

COMPANY ATLANTIC RICHFIELD COMPANY, ET. AL.

WELL CB-3

FIELD

COUNTY RIO BLANCO **STATE** COLORADO

LOCATION: NW SW SE

SEC. 5 TWP. 3S RGE. 96W

OTHER SERVICES:

PERMANENT DATUM GROUND LEVEL ELEV. 6743'

LOG MEASURED FROM GL

DRILLING MEASURED FROM GL

ELEVATIONS:
KB.
DF.
GL. 6743'

DATE	4 JULY 74		
RUN NO.	1		
TYPE LOG	TL		
DEPTH—DRILLER	2200 +-		
DEPTH—LOGGER	375		
BOTTOM LOGGED INTERVAL	375		
TOP LOGGED INTERVAL	290		
TYPE FLUID IN HOLE	WATER		
SALINITY PPM CL.			
DENSITY LB./GAL.			
LEVEL	282		
MAX. REC. TEMP.—DEG. F.	53°		
OPR. RIG TIME	1 HR.		
RECORDED BY	WILSON		
WITNESSED BY	TAIT		
LOCATION	LAS VEGAS		

RUN NO.	BORE HOLE RECORD			CASING RECORD			
	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1							

SSC-609-B

WELL DATA

TYPE WELL
RUN NO.
PROD. OR INJ. RATE
WELL HEAD PRESSURE
TYPE & AMT. CEMENT
LENGTH OF TIME:
PROD. OR INJECTING
SHUT IN
SINCE CEMENTING
PURPOSE OF SURVEY

EQUIPMENT DATA

TYPE LOG	TL
RUN NO.	1
TOOL MODEL NO.	LDAH-6010
DIAM.	3-5/8"
SPEED FT./MIN.	60
T.C. - SEC.	1
SCALE	1/4°/DIV.

GENERAL

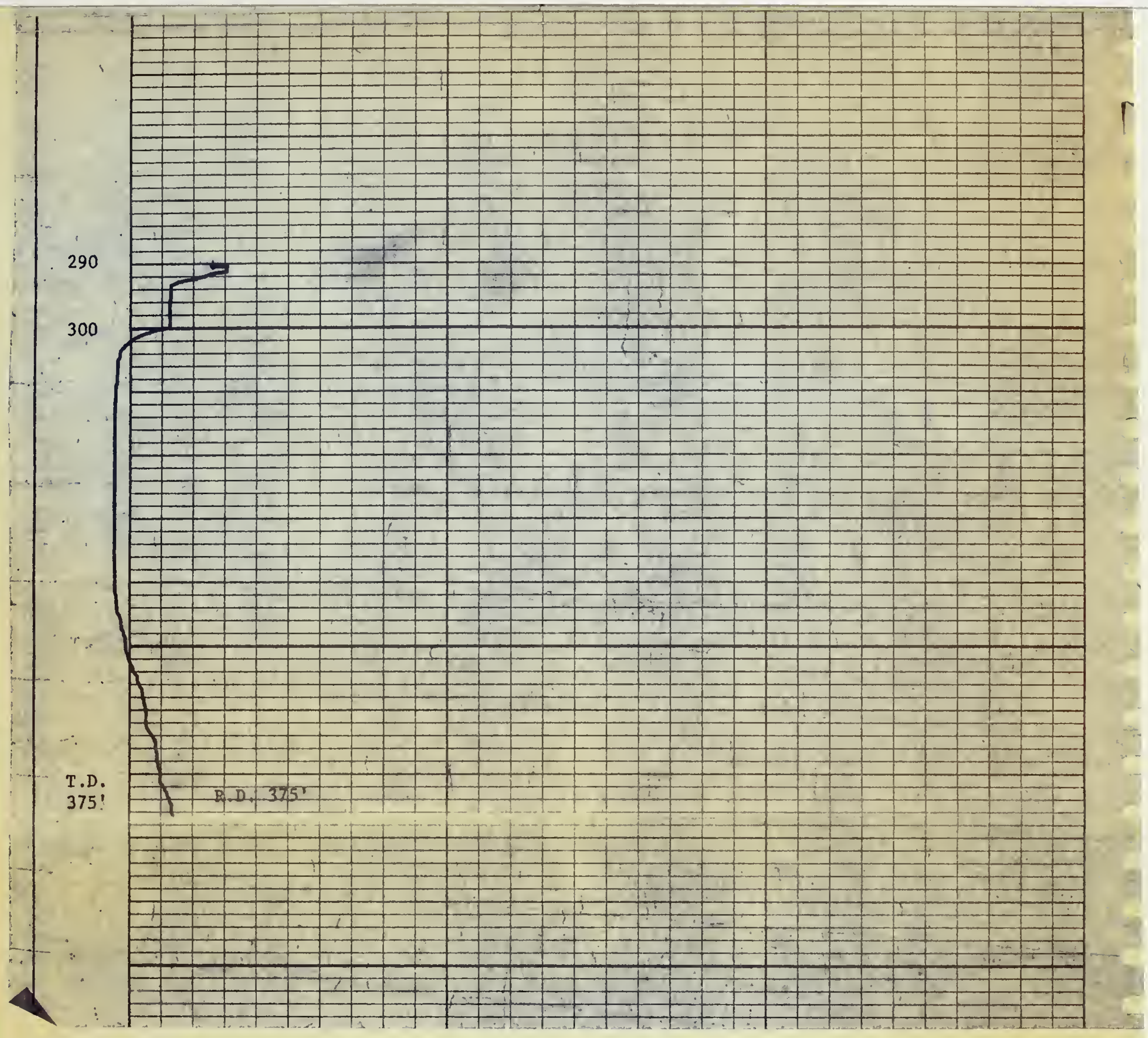
HOIST TRUCK NO.	2694
INST. TRUCK NO.	2694
TOOL SERIAL NO.	

REMARKS: N.A. Means not available

DEPTH

TEMPERATURE DEGREES FAHRENHEIT

45 46 47 48 49 50 51 52


290
300
T.D.
375'
B.D. 375'

EXISTING COREHOLE Cb-4

THIS ENVELOPE CONTAINS THE FOLLOWING GEOPHYSICAL LOG:

Birdwell: Temperature

II B-373

Birdwell

Temperature Log

FILING NO.

COMPANY ATLANTIC RICHFIELD COMPANY, ET. AL.

WELL TOSCO CB-4

FIELD

COUNTY RIO BLANCO **STATE** COLORADO

LOCATION: SE NW NW

SEC. 17 TWP. 3S RGE. 96W

OTHER SERVICES:

ELEVATIONS:
KB.
DF.
GL. 7054'

PERMANENT DATUM GROUND LEVEL ELEV. 7054'
LOG MEASURED FROM GL
DRILLING MEASURED FROM GL

DATE	4 JULY 74		
RUN NO.	1		
TYPE LOG	TL		
DEPTH—DRILLER			
DEPTH—LOGGER	1437		
BOTTOM LOGGED INTERVAL	1437		
TOP LOGGED INTERVAL	450		
TYPE FLUID IN HOLE	WATER		
SALINITY PPM CL.			
DENSITY LB./GAL.			
LEVEL	442		
MAX. REC. TEMP.—DEG. F.	53.5°		
OPR. RIG TIME	1 HR.		
RECORDED BY	WILSON		
WITNESSED BY	TAIT		
LOCATION	LAS VEGAS		

RUN NO.	BORE HOLE RECORD			CASING RECORD			
	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1							

9SC-609-B

WELL DATA

TYPE WELL	
RUN NO.	
PROD. OR INJ. RATE	
WELL HEAD PRESSURE	
TYPE & AMT. CEMENT	
LENGTH OF TIME:	
PROD. OR INJECTING	
SHUT IN	
SINCE CEMENTING	
PURPOSE OF SURVEY	

EQUIPMENT DATA

TYPE LOG	TL
RUN NO.	1
TOOL MODEL NO.	LDAH-6010
DIAM	3-5/8"
SPEED FT./MIN.	60
T.C. - SEC.	1
SCALE	1/4°/DIV.

GENERAL

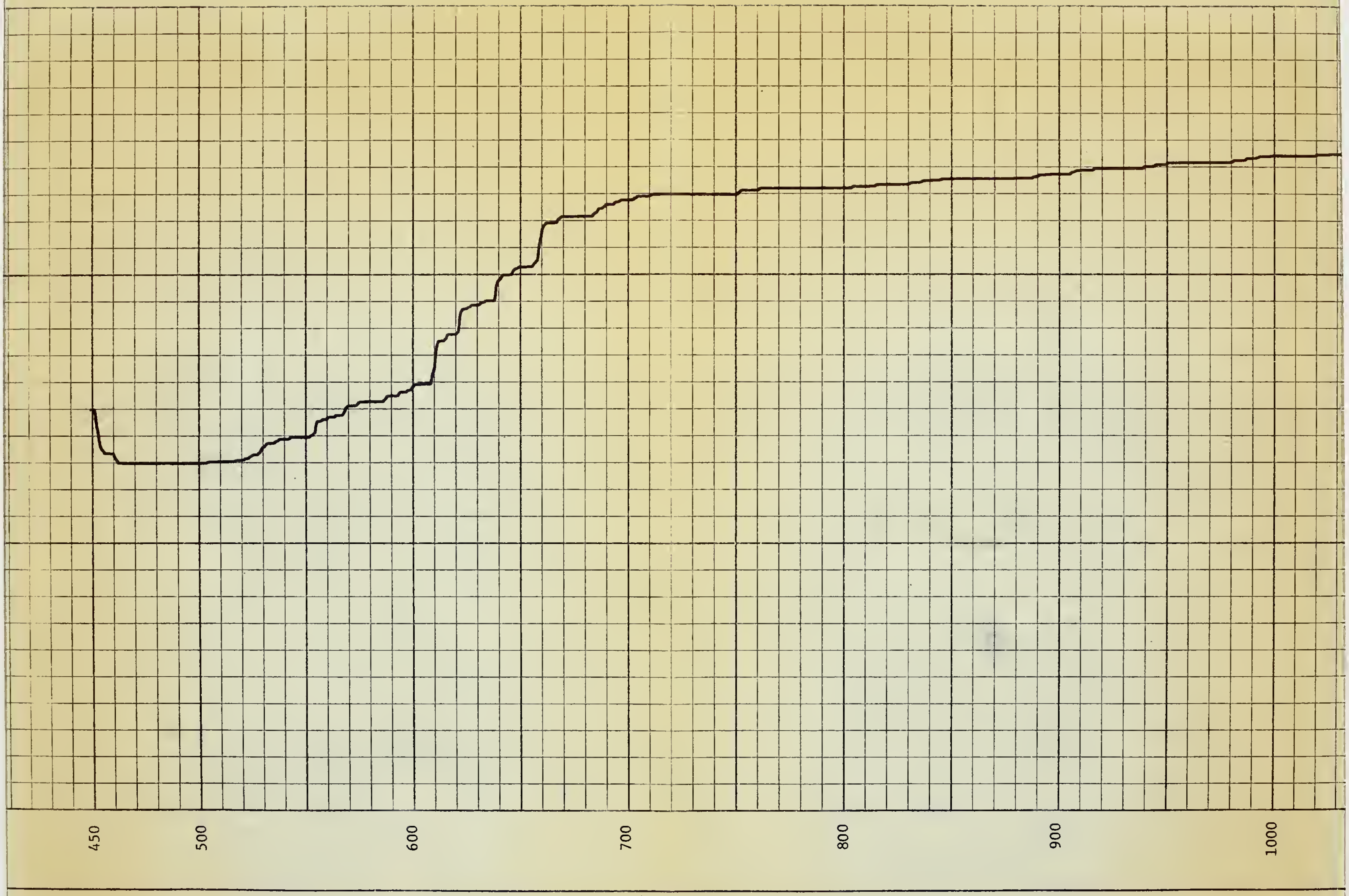
HOIST TRUCK NO.	2694
INST. TRUCK NO.	2694
TOOL SERIAL NO.	

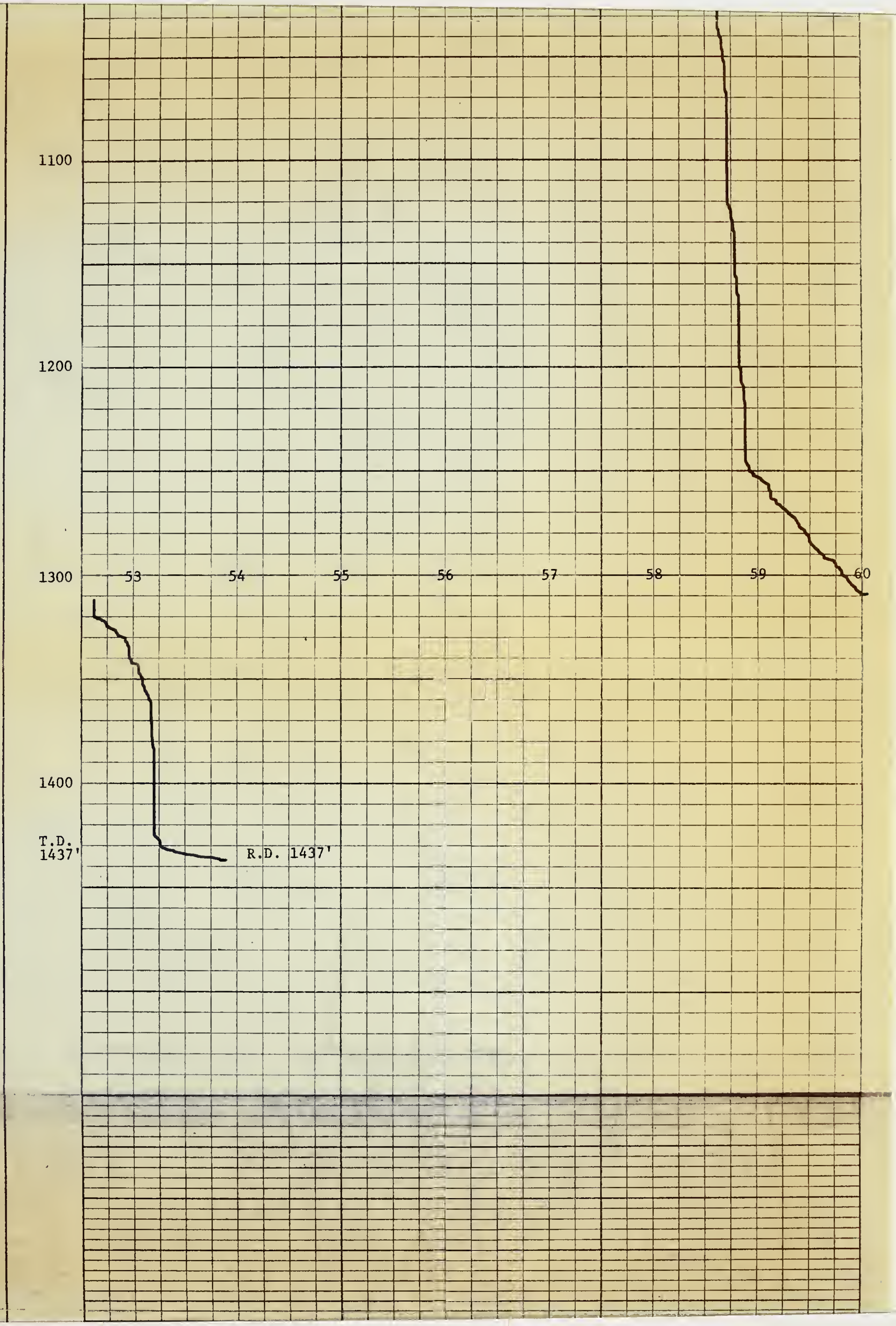
REMARKS: N.A. Means not available

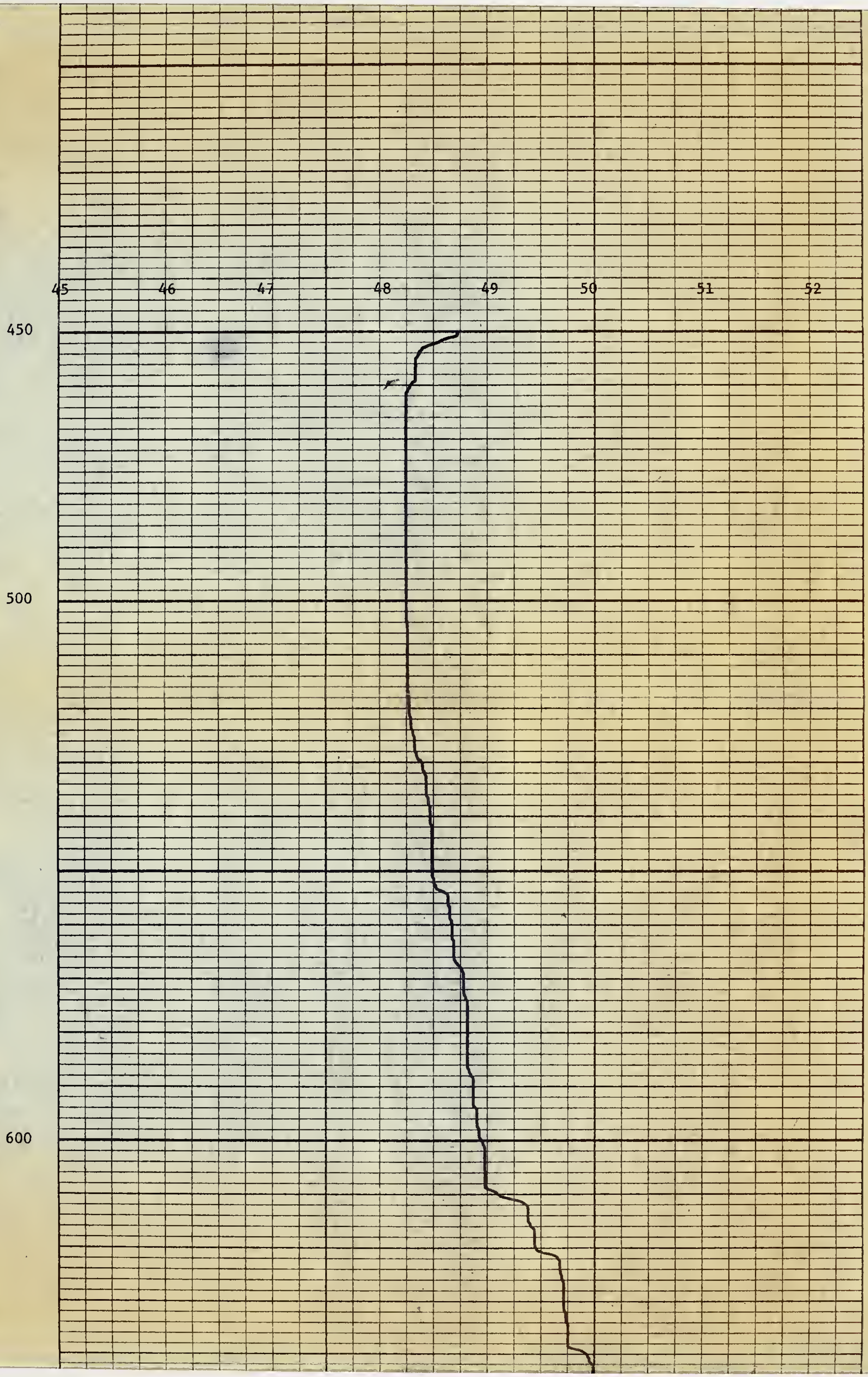
TEMPERATURE
DEGREES FAHRENHEIT

DEPTH

45 46 47 48 49 50 51 52


450
500
600
700
800
900
1000


1100
1200
1300
1400
T.D. 1437'
53
54
55
56
57
58
59
60
R.D. 1437'


45
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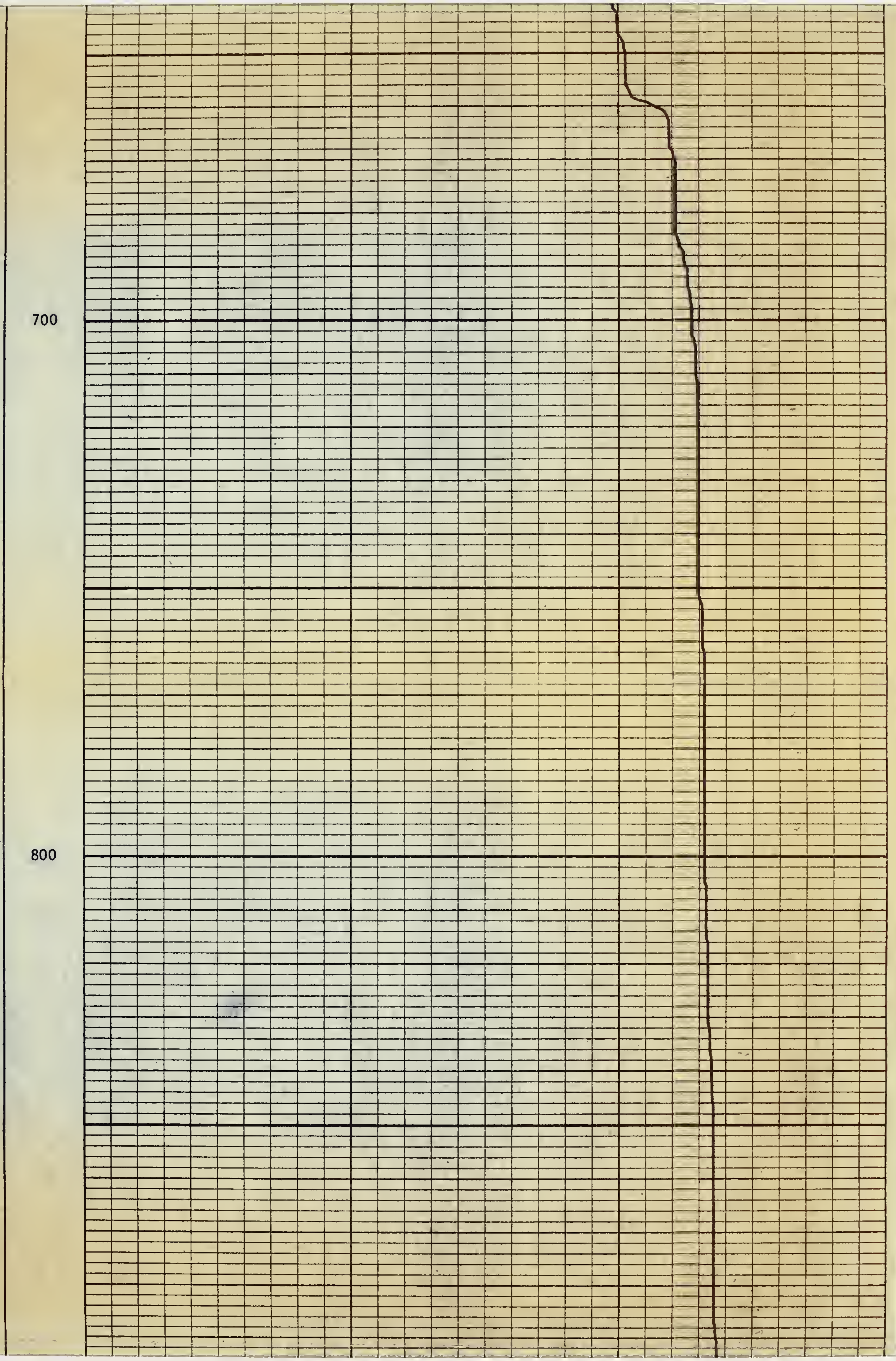
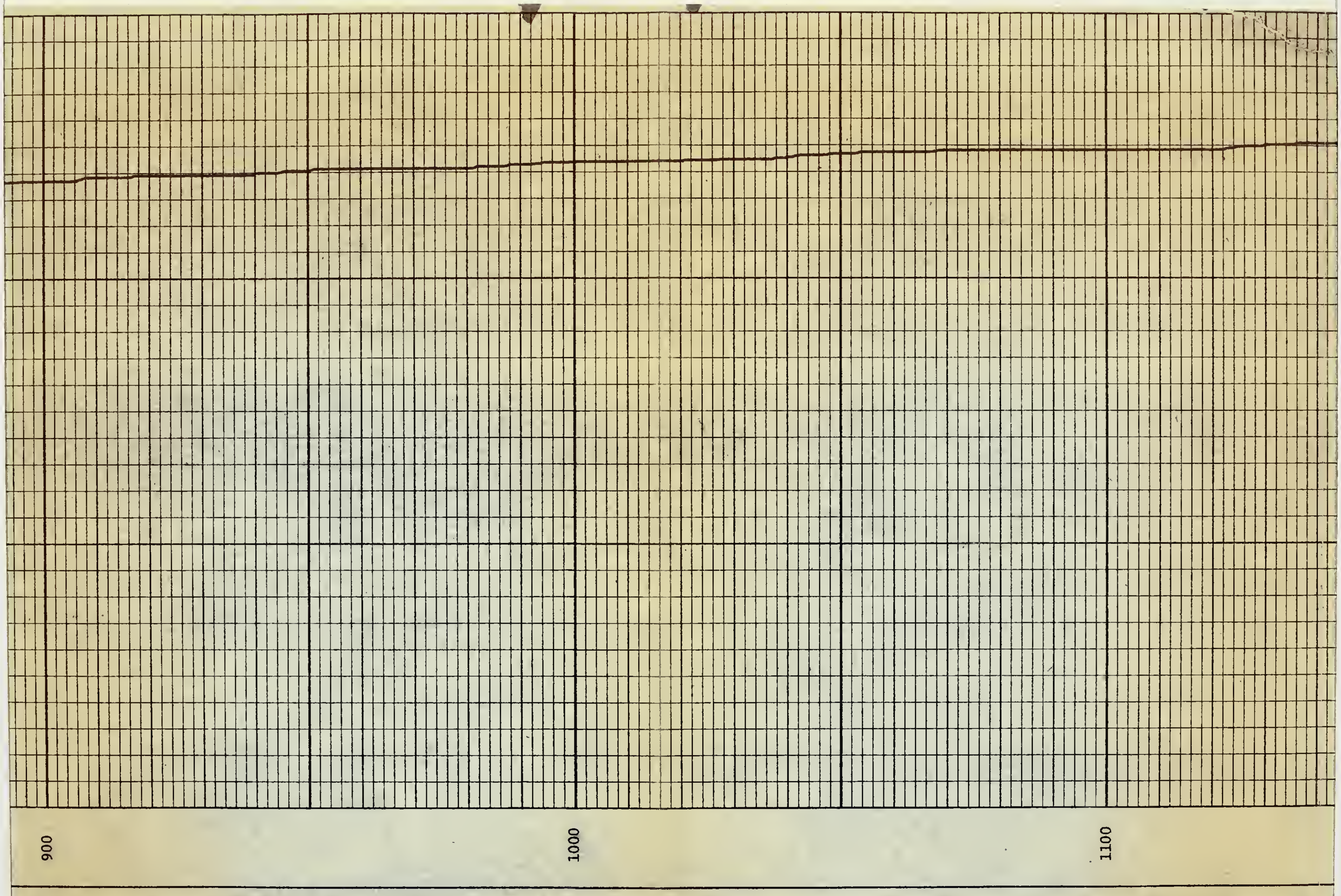
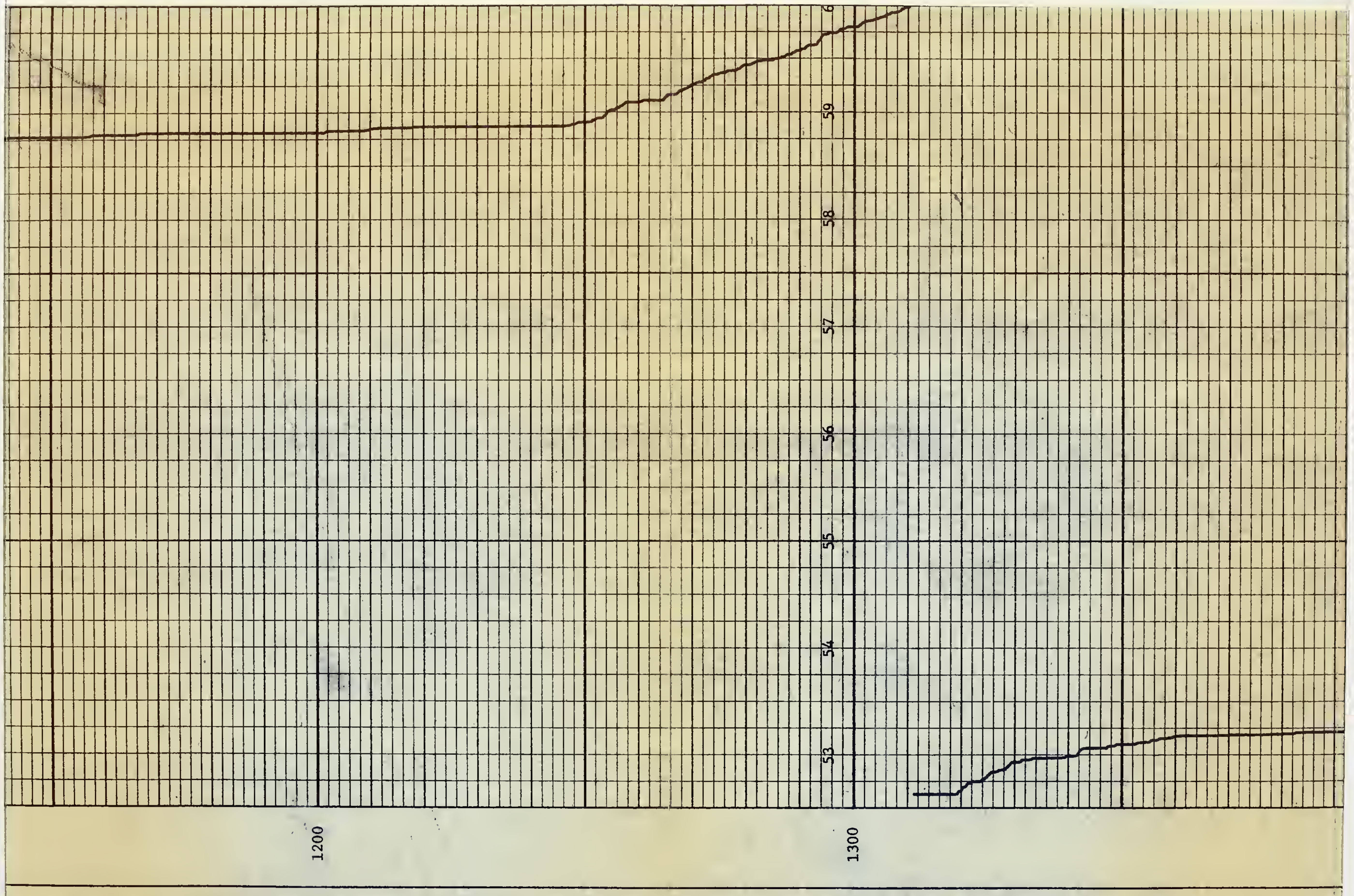
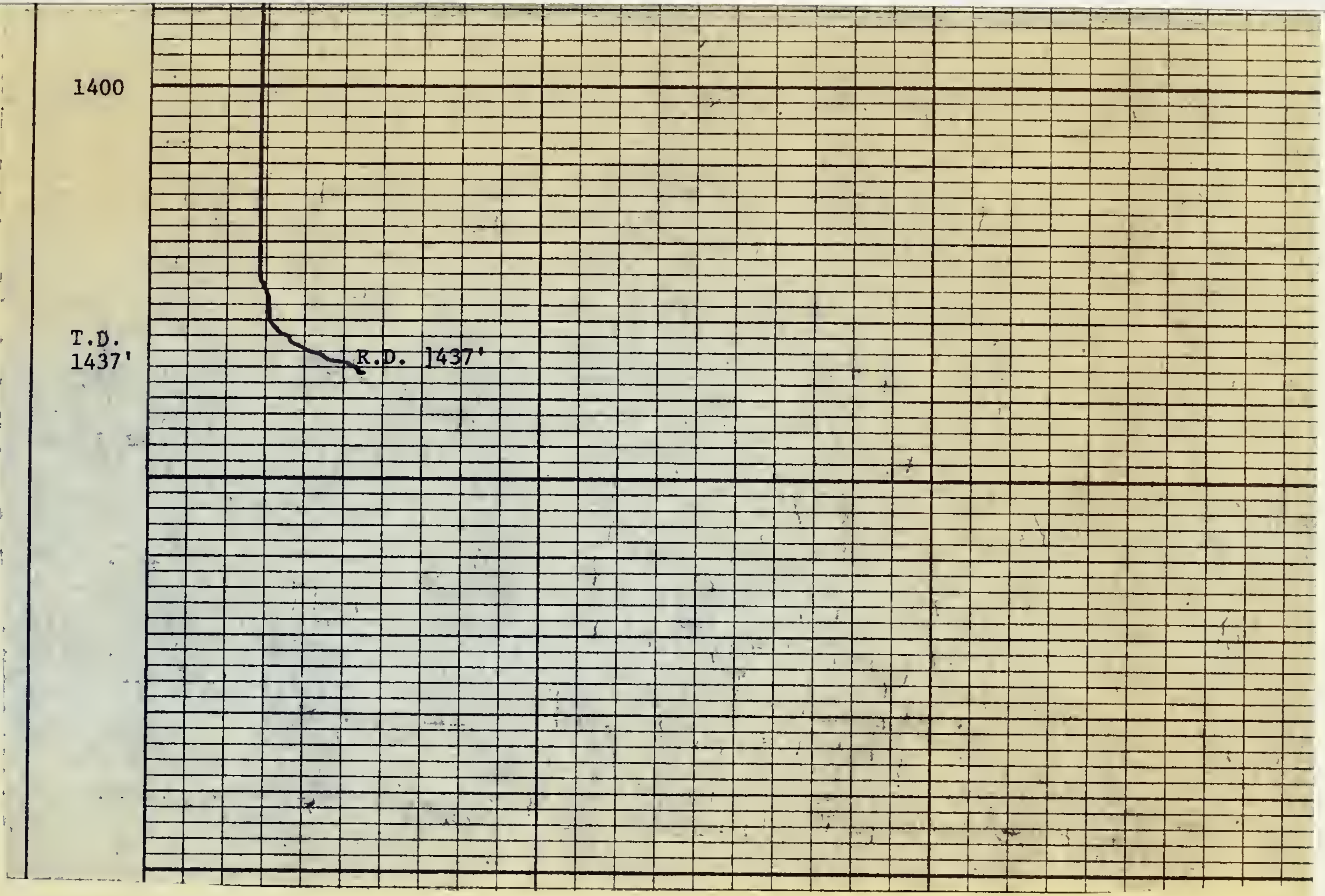
51
52
450
500
600


700
800


900
1000
1100


6
59
58
57
56
55
54
53
1200
1300


1400
T.D.
1437'
R.D. 1437'

CHAMPION CLASP NO. K-93
9½ x 12½